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VETERINARY MEDICINE

JANUARY 1944

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No. 1

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Continental United States uses less than six pounds of *rice* per person per year, while Puerto Rico uses 128 pounds and Hawaii 177 pounds.—*S. N. L.*

Hilton A. Smith has accepted a position as Associate Professor of Veterinary Pathology at Iowa State College. Doctor Smith was formerly affiliated with Colorado State College in the same capacity.

A short leave was granted recently to D. A. Sanders, of the Florida Experiment Station, to investigate diseases among Bahaman livestock and to advise methods of control. He went to the Bahama Islands at the request of the Marine Products Board of the Bahaman Government.

Army rations prescribe from two to three times as much meat per capita as is consumed by the civilian population and the government is feeding many million of the armed personnel daily. There are 40 or more different diseases or causes for which carcasses or parts of carcasses should be condemned, therefore, the importance of proper inpection of meat, together with dairy products, cannot be overestimated. The procurement, inspection and rationing of this vast amount of food-stuff is the duty of the Quartermaster Corps. Inspection of the meat and dairy products procured is assigned to the Veterinary Corps.

The John Scott Medical Certificate and Premium of $1000 has been awarded Richard E. Shope, a member of the Rockefeller Institute for Medical Research, for his "discovery of the complex etiology of swine influenza."

Because of numerous requests received by the Army for penicillin, Surgeon General Normal T. Kirk of the Army Medical Department states that the War Department "at no time has either controlled penicillin or received the entire output."

The Army, the Navy, U. S. Public Health Service and the Office of Scientific Research and Development, each receives a monthly allocation of penicillin from the War Production Board. Penicillin allocated to the Army Medical Department is intended for the treatment of military personnel and "none of it can be reallocated or released to civilians."

Penicillin is a new drug which is being used in the treatment of serious types of infections which will not respond to sulfa drugs. The supply of penicillin is limited and distribution is controlled by WPB.

Distribution of the portion of penicillin allocated to civilians is determined by Dr. Chester S. Keefer, Evans Memorial Hospital, Boston. Since the amount of the drug is limited, requests to Doctor Keefer must be made through the patients' doctors.

Let the County Agent Do It

Although urged by officials and packers alike, throughout October and November, to market more hogs, swine raisers were unmoved till December first when all took a notion to market their animals at the same time. Result: the market was glutted.

This insane marketing is not surprising when one evaluates the type of leadership the live stock raisers have. M. W. Pickell, editor of the *Grain and Livestock Herald,* having failed to foresee the debacle, was, nevertheless, ready with a remedy—divert the swine to country slaughter houses and appoint county agents to inspect the kill "or veterinarians where county agents are not available."

U. S. Gains Against Cattle Ticks

With the release (B. A. I. Order 377) from Federal quarantine on December 1, of about 4,250 square miles of land in Florida and Texas, the United States approaches practical freedom from cattle ticks, a pest that once caused a $50,000,000 annual loss.

Tick fever was the first disease proved by scientific research to attack its victim exclusively through an intermediate host or carrier. This discovery by the Bureau of Animal Industry a half century ago opened up a new field of medical research and led to the successful combating of many other insect-borne diseases.

Buffer Zone Retained

As a protection to the cattle industry of Texas and other parts of the United States, the Department still maintains, under quarantine, a strip of land in eight Texas counties bordering the Rio Grande. A force of inspectors will patrol this buffer zone in search of ticky cattle that drift across the border or are smuggled into the United States from Mexico—a necessary safeguard until some other arrangement is made, possibly a drift fence.

The effectiveness of the tick eradication campaign, begun back in 1906, is credited to the foresight and tenacity of the veterinary profession, aided by the effective cooperation of cattle owners and government, state and county officials. The eradication program involved the systematic dipping, in vats containing medicated solutions, of all cattle in 985 counties of 15 southern and southwestern states. The necessary dipping has been conducted bi-weekly during the grazing season of at least one year and in some areas final eradication of the ticks required several years.

Popular Support Replaces Former Violence

Scientists of the Bureau of Animal Industry performed the basic research work on the cause and transmission of cattle-tick fever. Subsequently, Federal and State veterinary officials established quarantine lines, planned and conducted the eradication work. But, in spite of loyal support by millions of progressive citizens, the campaign, especially in its earlier years, was received with a skepticism which sometimes developed into open opposition and acts of violence, such as the dynamiting of dipping vats, attacks on inspectors and even murder. Tick eradication was often a political issue. The lower courts handled hundreds of cases pertaining to compliance with dipping procedures. The United States Supreme Court rendered two decisions relating to tick eradication, both supporting it.

Benefits Vastly Outweigh Cost of Campaign

As the work progressed, the benefits in the form of better, healthier and more productive cattle became more and more apparent. The eradication of cattle ticks is now widely credited with building up the cattle industry of the South and making both beef production and dairying safe enterprises.

The aggregate cost to the Federal, state and county governments for cleaning up the cattle ticks was about $50,000,000. This amount, expended in the course of nearly a half century, is approximately the same as the loss caused by the pest each year at about the time eradication work was begun. In recent years, as the work has approached completion, expenditures have decreased. The main precautions for the future, veterinary officials say, are continued vigilance and the strict enforcement of regulations necessary to prevent the reinfestation of tick-free cattle of the country.

Of the diseases stored up in non-human reservoirs plague is the most interesting. In man plague is an accident; in rodents it is racial destiny. Dying rats were noticed in times of plague ages before their connection with the disease was established. In recent years rats and their fleas have been studied with lavish intensity.

* * * *

All bacterial toxins are antigenic poisons; i.e., in the body they stimulate specific antibody production. Toxins lose their poisonous properties with age and as a result of the action of various chemicals; e.g., formalin. They are then called toxoids and can be used for immunization purposes, since they still retain their original antigenic properties. Tetanus toxoid and diphtheria toxoid (anatoxin) are examples of this type of immunizing agents.

* * * *

Silage Quality and Vitamin A Content

Wisconsin research workers[1] report that the milk of cows fed poor hay and poor silage in winter time contains but 650 I. U. of vitamin A per quart but that milk from cows fed the same kind of hay and good corn silage contains 1600 I. U. per quart. They express the belief that the greatest single reason for the widespread loss of calves in late winter and early spring is a result of being fed a low vitamin-A milk from cows that have been kept on poor winter feed. There is also good evidence that poor quality silage is responsible for breeding trouble in cattle.

When properly made, corn silage is one of the most palatable and nutritious silages. Cutting the plant too early or too late, usually the latter, or failure to pack it into the silo properly or silo walls that are not air tight, result in poor corn silage.

"Silage and hay are the winter feeds that ordinarily contribute most carotene. If both are good, that's fine. If one is good and the other poor, dairy cattle may not do so well. If both are poor then the herd is very apt to run into trouble before spring."

[1] Good corn silage—why it pays—how to make it, 1943. Circular 337, University of Wisconsin, Madison.

Man and mosquitoes are equal partners in the spread of malaria and yellow fever.

* * * *

The tactile sense in the horse reaches its highest development in the lips, which not only act as a prehensile organ, but are an important factor in the selection of plants and grains eaten or rejected by the animal.

* * * *

A gift of £100,000 has been received by the Royal College of Surgeons for the institution of a chair of human and comparative pathology. The donor, W. H. Collins, Buckinghamshire, has provided in his will for an additional £100,000 for the same project.

* * * *

Hammurabi, who lived and reigned four thousand years ago, established quite definite laws and regulations for the conduct of veterinary practice. We do not know that there were any specially trained veterinarians at that time, but it seems a fair inference that there were, since his laws contemplated a veterinary service which could not have been carried out otherwise.

* * * *

Regarding Soybean Meal

Although to many of us soybean meal in rations to supply needed proteins seems of comparative recent innovation, such use was suggested* about 20 years ago by G. W. Browning of Mobile, Alabama. The formula fed the hens once a day by Doctor Browning was as follows:

20	pounds	soybean meal
15	"	wheat middlings
20	"	wheat bran
25	"	ground oats (screened)
10	"	cornmeal
6	"	meat scraps
4	"	mineral mixture

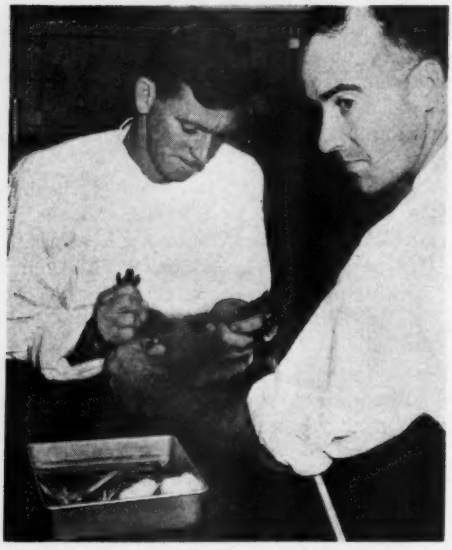
In connection with the above mash the following grain mixture was used:

40	pounds	wheat
25	"	oats
35	"	cracked corn

This mixture was fed late in the evening —about what they could clean up in 20 to 30 minutes.

*The veterinarian as a poultryman. *Vet. Med.*, 20:11, pp. 541-543.

Varied Practice at Army Veterinary Dispensaries



SOLDIERS' PETS

Because soldiers will make a pet of almost any species of animal, a veterinary dispensary at any military post is apt to be something of a menagerie. Within a few weeks a bear, a fox, two deer, the young racoon shown, a few cats and, of course, a large number of dogs were treated at this dispensary. The three young "he-coons," shown below, were brought to the dispensary to be castrated. The operation on one of them is shown at the left. Although they protested loudly against being held for the operation, they were ready and eager to eat within one second after the operation was finished

A Veterinary History of This War

The official veterinary history of World War I comprises but 16 pages in the monumental 17-volume, 16,000-page medical history of that conflict. Except for private enterprise the record of what was done by more than 2,200 officers and more than 18,000 enlisted personnel in the Veterinary Corps of the Army of 1917-19 would be preserved in a brief record of the organization and administration of the corps almost wholly in the Surgeon General's office, with only a paragraph about what the corps did —its activities in ocean transport of animals alone.

Better plans have been made for publishing an official record of the contribution of the veterinary profession to the winning of the present war. August 22, 1941, the Surgeon General of the Army directed the organization of a Historical Section in the Administrative Division of his office.

The medical histories of previous wars of the United States have been prepared by the armies and have dealt with medico-military matters exclusively. During the present war, since all civilian and governmental agencies are concerned, a committee of the National Research Council has made arrangements for a history of the Army, Navy, Public Health Service, Veteran's Administration and civilian medical agencies. Plans for a six-volume work have been approved—I, Organization Research and Liaison; II, Offensive Weapons in Relation to Injury; III, Medicine in the Emergency; IV, Surgery of the Emergency; V, Hospital Organization and Nursing, and VI, Medical History of Individual Operations and Engagements.

The Surgeon General has planned to supplement the foregoing with seven volumes of exclusively Army Medical History as follows: I, Administrative Organization, Planning and Operation; II, Training, Aviation Medicine and Chemical Warfare; III, Military Hospitals, Construction, Organization and Operation; IV, Sanitation, Epidemiology; V. Vital Statistics; VI, Dental Service, and VII, Veterinary Service.

As these plans were made before the declaration of war and when the magnitude of the conflict was perhaps not fully envisioned, they are, of course, subject to extension. However, no changes have as yet been announced.

Unlike the excellent history of the British veterinary services in World War I, the proposed volume on veterinary service in the present war may not give much information concerning the professional work of veterinary officers. It is such information that makes it readable to the profession in general and it is also the part that contributes to the advancement of veterinary medicine. It will be unfortunate if it be not included. The plan is to stress matters that concern organization and functioning of various parts of the Medical Department.

Col. F. W. Weed, M.C., who is in charge of the section of the Surgeon General's office which is collecting the material for the history says: ". . . there is ample evidence in the general medical literature, not only of the preceding World War but also of previous wars of relatively recent occurrence, to show that internists and surgeons did not have to be urged to write of their professional experiences. A sufficient number of them did this, inspirationally, to furnish an abundance of material for the later general literary treatment of a given professional subject—effort, therefore, should be concentrated on insuring as nearly complete data as possible concerning the administration, in contradistinction to the purely professional features, of a prospective medical and surgical history."

It is true in this war as well as in World War I that officers of the Medical Corps supply, "inspirationally" as Col. Weed says, a vast amount of professional medico-military literature to current medical periodicals. The *Military Surgean* is made up entirely of such articles; the *Journal of the American Medical Association* carries one or two and sometimes more such discussions every week and state medical journals publish many additional discussions by medical officers; but veterinary journals publish, by comparison, very little material dealing with the professional work of veterinary officers in the Army. The reason is not readily apparent. Can it be that the

veterinary profession as a whole is less interested in the problems, the duties and achievements of its military members than is the medical profession? Certain it is that the medical profession is far better informed as to its own contributions to the war than is the veterinary profession.

It is trite to say that all recent wars have contributed enormously to the advance of medical science and it must be regrettable, indeed, if this war which has taken 30% of the veterinary profession of this country into the armed forces, does not contribute materially to the progress of veterinary medicine.

Ration Changes Helpful

The shortages of horsemeat and liver, now handicapping fur farmers, can be partly met by making changes in the rations.

A. I. Coombes and E. B. Hart of the University of Wisconsin are recommending that horsemeat or other "red" meat be partly replaced by cooked fish and fish trimmings. Tests they have made show that fish products of little or no value as human food can be used successfully in place of 30 to 35% of the horsemeat generally fed to minks.

They are suggesting that fur producers, unable to obtain high-grade fresh liver, try either the abnormal-looking telang livers, or commercial liver by-products such as LiverA and LiverA Compound. An experiment with minks of 10 months' duration showed that these animals did as well on 3% LiverA as on 10% fresh liver. LiverA compound, which has replaced LiverA on the market, appears to be equally valuable.

Another fur farming problem investigated during the past year in Wisconsin is that of hemorrhagic gastroenteritis in minks. Although the direct cause is unknown, Coombes and Hart found it can be prevented by including in the ration either 10% fresh liver or 3 to 4% liver substitutes, along with 2% dried brewers' yeast and 5% of such fresh vegetables as tomatoes, carrots, lettuce and Swiss chard.

Still another scourge, that of bladder stones in minks, appears to be caused by an improper calcium-phosphorus balance in the ration. Although the evidence is not conclusive as yet, preliminary trials indicate that about 85% of the cases can be remedied by feeding extra calcium carbonate in an amount equal to one-half the weight of the normal ash content of the ration.—*Amer. Natl. Fur & Mkt. Jnl.*

The new head of the Department of Veterinary Anatomy at Michigan State College is Russell A. Runnells. The doctor went to M. S. C. from Iowa State College where he had been Associate Professor of Veterinary Pathology.

"It seems reasonable to believe that in the future public-health officials will not always grade milk on the basis of its cleanliness and safety alone, but will also grade it with reference to its nutritive value. Recently, it has become quite apparent that the kind of feed a cow gets very much affects the nutritive value of the milk she gives."—*Leslie C. Frank, U. S. Public-Health Service*

As a step in the direction of creating a world in which each country is helped to improve its own lot, the delegates to the United Nations Conference on Food and Agriculture, held at Hot Springs, Va., recently, proposed that the United Nations collaborate in spreading the use of farm machinery, fertilizers, insecticides and veterinary medicines, especially in those countries where these products have been unavailable or used only to a limited extent.

Possible Malaria Deterrent

In experiments with chickens and ducks, Dr. William Trager, of the Rockefeller Institute for Medical Research, has found that biotin plays an important role in resistance to malaria. Not even a severe deficiency of biotin was necessary to reduce resistance to malaria. It is not known whether this discovery can be utilized to build a diet for soldiers to make them more resistant to malaria, as it has not as yet been shown whether these findings are applicable to man.

Treatment of Wounds Contaminated with Rabies Virus

For hundreds of years madstones and charms of various types were applied to the wounds, resulting from the bites of rabid dogs, to remove or otherwise circumvent the infection. As the science of medicine progressed, physicians began to lose faith in the efficacy of such preventives of this most dreaded of diseases. There then came into use a whole series of drastic escharotics applied to the wounds with intent to neutralize the infection and with the certainty of disfiguring or crippling the patient. Of these, gunpowder packed solidly into the wound and ignited was probably the most spectacular and a red-hot iron applied liberally in the wound and about it was probably the most effective. For the last half century fuming nitric acid has held the fancy as the most powerful medicine available and suited to a task requiring great power. It will dissolve even a red-hot iron so it was reasoned it would surely destroy rabies virus. There was no evidence that the treatment possessed any value other than that of impressing the patient and his friends, nevertheless its disfiguring, maiming use continued—based upon deductive reasoning alone.

Recently Shaughnessy and Zichis[1] tested the efficacy of nitric acid as a preventive of rabies when applied to wounds contaminated with rabies virus and found that it actually has considerable value. When applied within 30 minutes of the infliction of the wound only 11% of the animals—guinea pigs—contracted the disease. Sixty-three percent of the controls succumbed. Unfortunately for the reputation of powerful remedies, tincture of iodine was found to be equally effective and plain soap and water was twice as effective in preventing the development of rabies from infected wounds. All applications were apparently less effective when applied two hours after infection and definitely so after six hours. Antirabic vaccination will continue, but nitric acid as a preventive should certainly give way to soap and water.

[1] *Jnl. A.M.A.*, Oct. 30, 1943.

★ ★ ★ BUY WAR ★ ★ ★
STAMPS AND BONDS

LOUIS PASTEUR
Of the many outstanding discoveries of Pasteur, his development of a vaccine against rabies is best known to the public

Twenty years elapsed after Pasteur began the prophylactic treatment of rabies before the Negri body examination was developed and laboratory examination of the brain acquired any standing at all. During all that time rabies in dogs was being diagnosed clinically and on the history and post-mortem findings.

The Pasteur Institute

The first building of the Pasteur Institute was opened in Paris on November 14, 1888, after an international subscription had been raised to erect it. Before the present German occupation 150 doctors and chemists, with 400 assistants, were employed in the Institute. The Institute was maintained by legacies and gifts and by income from the sale of serums and certain ferments used in industry. Its present status is unknown.

Although best known to the general public for its antirabies serum, Pasteur Institute also produced serums with which many millions of people were inoculated, each year, against cholera, diphtheria and many other diseases. Tuberculosis is the latest disease to be fought by serums from this Institute. In the stables of Napoleon III at Garches 400 horses provided the various serums. In one year recently 9,000,000 natives in the French colonies were inoculated against cholera.

The Why of Meat Rationing*

By ROY F. HENDERSON
U. S. Director of Food Distribution

AMERICAN meat has been going to war—more of it than ever before in history. The shopping list of our armed forces and allies for the 12 months beginning October 1 shows how important U. S. meat and meat products have become to the overall job of winning the war. I'll read that list to you—item by item:

4,096,000,000 pounds of pork
1.119,000,000 pounds of lard
282,000,000 pounds of lamb and mutton
2,310,000,000 pounds of beef
194,000,000 pounds of veal

It all adds up to over 8,000,000,000 pounds.

Now let's break down these requirements. First, our own soldiers, sailors and marines need 2,181,000,000 pounds of beef; 1,437,000,000 pounds of pork; about 141,000,000 pounds of lamb and mutton; 184,000,000 pounds of veal, and 87,500,000 pounds of lard for these next 12 months.

Of the 2,938,000,000 pounds of meat and 1,031,000,000 pounds of lard allocated to the United Nations, Russia is scheduled to receive 1,114,000,000 pounds of pork; less than 3,500,000 pounds of beef; and slightly more than 390,000,000 pounds of lard.

Small as these exports will be in relation to the quantities needed, they will help the Russian army push the Germans back.

Our meat shipments to Britain in the 12 months ahead are planned to be:

1,283,000,000 pounds of pork
229,000,000 pounds of lard
140,000,000 pounds of lamb and mutton
56,000,000 pounds of beef
7,000,000 pounds of veal

Again the beef is relatively small compared to other products.

In the cases of beef and veal, these go entirely to officers and troops, and to merchant ships the British are operating.

Civilians in England have made considerable shift from beef to pork to keep their armies supplied. It is pork primarily that we send them. I want to stress that the food we are supplying and must continue to supply our allies is a matter of military necessity. It must be a scheduled, dependable supply.

Since the beginning of the program early in 1941 up to September 1, we have shipped 2,000,000,000 pounds of meat and 1,000,000,000 of lard to Britain, 760,000,000 pounds of meat and 127,000,000 of lard to Russia. During the last few months more meat has been going to fill the pressing food needs of Russia.

Why Our Allies Need Meat

England's complete separation from former important continental sources meant about 30% less pork imports. As far as possible, this must now be made up principally from the United States and Canada. Still, meat consumption this year in the United Kingdom will be much less than it is here at home—107 pounds per capita as compared with 136 pounds in the United States.

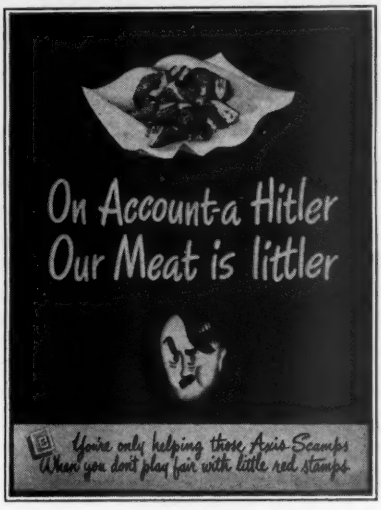
British pre-war consumption was 136 pounds per capita while that of the United States was 135 pounds.

In general, the United States is refraining from drawing on outside supplies of meat. However, we have found it necessary to share in outside supplies of certain products such as canned beef from South America. This needed quantity is allocated to the services from the over-all supply committed under contract to the British Ministry of Food which has been designated as the sole purchaser currently for the United Nations of the entire exportable supplies of Argentina, Brazil, Paraguay and Uruguay.

Another important and essential meat source area which has been available to the United States for more than a year has been New Zealand and Australia. American troops in the south and southwest Pacific areas have been able to fill virtually all of their meat needs from the available supplies of the two Dominions on a reverse lend-lease basis. Obviously, the diversion to the American troops of meat which otherwise would have gone to the United

*Excerpts from talk given at the annual meeting of the American Meat Institute, Chicago, October 5-7, 1943.

Kingdom is saving precious shipping, however, it increases the problem of supply for the United Kingdom. In order that our armed forces and the United Kingdom needs may be accommodated as fully as possible, both Australia and New Zealand,


On Account-a Hitler
Our Meat is littler
You're only helping those Axis Scamps
When you don't play fair with little red stamps

Courtesy National Provisioner

WHERE THE BLAME BELONGS

This unique poster, gotten up by the American Meat Institute, graphically explains the fundamental reasons for all temporary dislocations in domestic meat supplies

through a system of requisitioning for export, have effected reductions in the meat supplies available to their civilians.

Canadian pork exports today are three times larger than they were in 1936 and represent more than one-half of the total Canadian production. Our exports to the United Kingdom during 1943 will be about 25 times as much as in 1936.

Russia's ability to produce its own meat has been cut drastically. At the peak of the Nazi invasion, at the time of Stalingrad, approximately 40% of the most fertile crop land and a large part of the livestock belt in the Soviet Union were occupied by the enemy. Winning this back doesn't mean immediate return of food supplies. It will take time to bring it back to full production—especially livestock.

Here at home meat production is at the highest level in history—estimated at 24,000,000,000 pounds for the next 12 months. However, we have reached a place where we are out of balance with feed supplies.

In the face of not enough meat and other foods to meet fully the ever-increasing demands, we have had to budget food expenditures as I have outlined. We call it *allocation*. When we allocate foods, we are simply adjusting requirements to the prospective supply in such a way that this supply is utilized to the best possible advantage in the war program. It isn't easy to see far ahead in view of the innumerable shifting factors affecting supply and requirements, but such programming is indispensable. Allocation of our food has become a basic step in food distribution.

On the basis of allocations established for the next 12-month period, U. S. civilians will receive 17,000,000,000 pounds of meat, or almost 70% of the expected supply.

Rationing of meat supplies is here for the duration. While the distribution of our meat supplies is still a major food problem, rationing has helped. It is necessary for all of us to cooperate in every way to make rationing work well.

Starting with 1942, there was a tremendous increase in demand for meat—especially for beef. The American public, with a great dormant demand for more meat, had almost overnight been given the buying power to satisfy an old, old desire. Various public opinion surveys, aimed at finding what people would do if they had more money, almost invariably showed that consumers would like to use more meat—especially more beef—and, specifically, more steak. These pre-war surveys have been amply proved correct.

We were beginning to find out what people would eat if they had what they wanted, but the impact of this sudden increase in buying power had far-reaching effects. Markets were soon depleted. Regulations of some sort were inevitable. We have reluctantly introduced regulatory measures—never until the emergency of war appeared to require them. Then, when and if any regulation had completed serving the purpose for which it was made, it has been cancelled or suspended immediately. By the same token, when a regulation has been necessary, we have not pussyfooted.

A New Conception of Azoturia

By JOHN W. PATTON
East Lansing, Mich.

THE prompt recovery of three recent cases of azoturia in horses has renewed the interest of the writer in this disease and in a new method of treatment. It is realized, of course, that the importance of azoturia is insignificant compared with what it was a generation ago, nevertheless in the whole country some thousands of cases probably occur annually. Furthermore, there is a great personal satisfaction to the veterinarian in seeing his cases of this baffling disease recover almost with the certainty and the promptitude of milkfever cases. And, finally, the treatment used in these cases possesses scientific interest for the light it may throw on the pathology of azoturia—a phenomenon that has so far eluded all investigation.

The literature on azoturia is extensive. Prior to World War I it was the subject of innumerable discussions at veterinary meetings and of articles in veterinary periodicals almost monthly. It has been known by a variety of names—Monday morning disease, cold weather disease, holiday disease, Easter disease, blackwater, hemoglobinuria, hemoglobinemia paralitica, lumbar paralysis and, finally, "spinal" for spinal appoplexy—a name commonly given it by teamsters. Azoturia, the oldest and most used name, Udall and others have pointed out, is a misnomer since the amino acids in the urine are normal. Each of these names, except the last, is descriptive of some characteristic of the ailment.

Azoturia is unique in many respects. It occurs only in horses. There are no recorded cases in mules or asses and the few that have been reported in cattle are open to question. A few cases have been found in colts and a small percentage in light horses but more, perhaps, than any other ailment of animals, it is prone to have a typical history, a typical onset and to run a typical course. This uniformity is significant of a single, definite etiological factor. The typical case occurs in a draft animal that is liberally fed and has been at hard work; then rested for two to four or five days while the heavy feeding continued—then worked or exercised again. The exercise may be as light as taking the animal from its stall and leading it a few hundred feet to water; however, attacks usually occur after the animal has been driven at its ordinary work for about half an hour. If the rest period has been as long as a week there is little or no danger of azoturia when the animal is put to work and this too seems significant.

The symptoms, also, are very typical and not easily confused with those of any other disease. The onset is sudden — explosive really. The symptoms begin with excitement, profuse perspiration, colicky pains, weakness of the quadriceps femoris muscles, difficulty in standing or inability to stand; the animal goes down, pain becomes intense, the gluteal muscles become tense, hard and swollen and, in a remarably short time, the urine becomes coffee-colored. The bowels are sluggish and urination and defecation is delayed or suppressed. The excitement increases to delirium and the struggling becomes convulsive. Mortality is high and, unless improvement be prompt, those cases that do recover are likely to suffer extreme atrophy of the quadriceps and to require many weeks or months before full usefulness of these muscles is regained. The case is afebrile from beginning to end or until decubital infection signalizes the coming of the truck from the rendering plant.

The characteristics of the disease listed in the foregoing are worthy of study separately and as a group. The history of an attack right up to the onset is indicative of a dietary or, shall we say, nutritive connection. It is common to say, "the ailment occurs in well-nourished horses." That phrase has been intentionally avoided in this discussion. We are apt to think of nourishment as consisting of ingestion, digestion and absorption, forgetting there are two more steps in it—metabolism and elimination, and that failure of any one of the five steps defeats the whole. Right up to the onset of an attack of azoturia, ingestion, digestion and absorption are caried on at a high level —but what about the other steps in ana-

bolism and catabolism? The syndrome in azoturia is exactly what one would expect to be produced by an excess of lactic acid in the blood and the muscles. Carlström reports finding the lactic acid content of the blood in horses afflicted with azoturia to vary between 16 and 182mg percent, and that the amount was proportional to the severity of the attack. He also found the lactic acid content of normal horses to vary between only nine and 12mg percent and suggested the possibility that the pathological processes are due to the excess of lactic acid. Carlström reports, also, a high glycogen content in the blood and muscles of horses suffering from azoturia but states that the glycogen is not injurious. It is the present writer's contention that the excess of lactic acid and glycogen in the blood and muscles of affected animals is an effect—not a cause—of azoturia and that both are significant although it is the former that gives rise to the symptoms that manifest the ailment.

Both lactic acid and glycogen are intermediary products in the metabolism of carbohydrates. Their excess in the blood and muscles signifies a disturbance or unbalance of the metabolic processes by which carbohydrates are prepared for body uses, particularly by which they are changed into energy.

Thus we postulate: A horse is consuming and utilizing carbohydrates at a high level during regular work—a rest period suddenly ensues but the high level of carbohydrate intake, now unnecessary, continues. For some reason the organism is unable to completely metabolize this superabundant amount of carbohydrates and store it as fat or to eliminate it through the emunctories. As a result these incomplete products of combustion accumulate as lactic acid (probably pyruvic acid also), and as glycogen excesses in the blood and muscles. In a few days the animal reaches a delicate balance between health and disaster. If given time, the organism will adjust itself to the resting condition, probably by lessened intake, and all will be well. However, should the animal be again put to work, right at the critical period, and the work, as always, stimulate metabolism immediately; the increased accumulation of products of incomplete combustion overwhelms the organism and the catastrophe, which we call azoturia, ensues.

To say that azoturia is a metabolic upset poses the question as to why the disturbances in carbohydrate metabolism occur.

When a sudden short period of idleness intervenes in the routine of a hard-worked, high-fed team and the ration is not cut down the animals are likely subjects for azoturia when work recommences. By drastically reducing the amount of grain fed when the animal is idle the danger of azoturia is avoided

The answer is probably that metabolism fails under the difficult conditions that have developed for lack of a stimulant, a catalyst or a governor. Exercise is such a stimulant;

Pony described in case three

thiamine is such a catalyst, and hormones are such a governor. All cells must have thiamine to convert glycogen into heat and energy. Whenever the individual cells are unable to obtain heat and energy from carbohydrates, a thiamine failure is to be suspected. It is intimately bound up with the utilization of carbohydrates by the tissue cells. As to why the victim of azoturia should have possessed insufficient thiamine activity immediately before the attack, leads into the field of speculation. In view of the present limited state of our knowledge of both thiamine and metabolism, it is probably more appropriate to discuss a treatment of the condition which gives promise than to speculate on a matter about which so little is positively known.

Case No. 1.—A 14-year-old pony exhibited unmistakable symptoms of azoturia. The case was mild and the pony did not go down, however, she was unable to handle her hindquarters.

One hundred thousand units of thiamine-hydrochloride were given, hypodermically. Recovery was complete in six hours. Recovery was probably to be expected in this case without treatment but not so promptly.

Case No. 2.—A heavy farm horse was stricken with a severe case of azoturia. It had been flat on its side, unable to rise, for 18 hours when given an injection of 180,000 units of thiamine hydrochloride. With considerable help the animal got to its feet in five hours. The next morning an additional 100,000 units of thiamine were given and thereafter the horse rested on its sternum when lying and was able to get up and down unaided. Recovery was complete in seven days.

Case No. 3—A Welsh pony exhibited unmistakable symptoms of azoturia and was down on her side for 22 hours and unable to rise even with help, when an injection of 75,000 units of thiamine-hydrochloride was given. She arose unaided in two hours and remained standing for three hours. She then rested on her sternum most of the time for 12 hours, then got up and down at will but continued awkward in walking and the quadriceps muscle continued trembling. Another 50,000 units of thiamine-hydrochloride was given on the second day and repeated on the third day. By the fifth day all evidence of the attack had passed off, that is, recovery from the acute symptoms of azoturia was complete. Apparently, trophic nerves to the quadriceps and gluteal muscles were injured during the 22 hours that the horse was ailing before treatment began, because atrophy of these groups of muscles set in in a few days and became extensive.

The recovery of three consecutive cases of azoturia, particularly when two of them were light horses, is not particularly significant. It was the way they responded to thiamine therapy that *was* significant. Both the ponies were obviously improved very shortly after receiving the thiamine injections. The sweating stopped, the dyspnea passed off, the struggling ceased and the discomfort was obviously lessened. Improvement in the farm horse followed the same sequence and was even more striking though less speedy. None of the three animals received any treatment whatsoever, other than the subcutaneous injections of thiamine.

Then there is the logic of the matter. Just as incomplete metabolism should cause an excess of lactic acid and other intermediate products of incomplete carbohydrate metabolism in the blood and muscles and as an excess of lactic acid should produce the symptoms of azoturia, so thiamine, a catalyst in carbohydrate metabolism, should overcome the metabolic dysfunction and eliminate the pathological process causing the ailment. That, apparently, it does this with certainty and promptitude, fits into the foregoing postulate, as it would be expected to do if the postulate were sound.

The suggested dose of thiamine is 10,000 to 15,000 units per 100 pounds of body weight, administered every 12 to 24 hours as needed.

Effect of Green and Sprouted Potatoes on Laying Pullets*

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Introduction

SINCE the war began large quantities of potatoes have been used for poultry feeding to eke out the limited supplies of rationed concentrate feed. The suitability of cooked potatoes as a source of carbohydrates to the bird and the optimum levels of inclusion in the diets of different classes of poultry stock have been amply demonstrated by experience and experiment. Two sources of potato supply have been available to the poultry keeper: (*a*) supplies of normal quality potatoes, surplus to human requirements which have been released periodically for stock feeding and (*b*) chat and other types of potatoes regarded as unsuitable for human consumption. The latter category has included greened and sprouted tubers which owing to their poisonous nature have presented special difficulties to the poultry keeper. At the National Poultry Institute we have received numerous enquiries for advice regarding their effects when fed to poultry and methods for detoxicating the tubers. Some poultry keepers have gone to the extreme of removing the sprouts or peeling the potatoes and rejecting the skins, but on a large scale the labor required is usually prohibitive.

Toxic Principle

The berries, haulm, green sprouts and greened skin of the potato contain the poisonous alkaloid solanine C_{52} H_{91} O_{18} N, which on hydrolysis yields solanadine C_{26} H_{41} O_2 N and a molecule each of dextrose, galactose and rhamnose. Although the harmful effects are ascribed to solanine, solanadine, which may occur to the extent of 1.5% in the young green potato, is credited with morphine-like properties. The concentration of solanine in different parts of the plant appears to be associated with the intensity of green pigmentation. Esser states that the solanine content of the actively growing haulm is about 0.09% which decreases to 0.037% towards the end of the summer. Young green sprouts contain up to 1.5% of the alkaloid and the content is also very high in tubers which have been greened by prolonged exposure to light. Reference to the available literature reveals little information on the specific effects of solanine when ingested by poultry although numerous cases are on record of poisoning of other species of farm live stock.

Chesnut and Wilcox[1] describes fatalities among pigs due to the consumption of sprouted uncooked potatoes. After cooking the potatoes proved innocuous and the authors contend that with sufficient boiling most of the alkaloid passes into the cooking water which might be thrown away.

Behre and Ehrecke recorded cases of illness among humans during the Great War due to eating green potatoes. Analyses showed that the green parts of the skin which had a markedly bitter taste contained practically the entire solanine content of the tuber. More recently Salomon gave an account of the occurrence of solanine poisoning in ducks following the feeding of cooked sprouted potatoes. When the feed was changed the symptoms disappeared immediately. The poisoned birds showed signs of opisthotonus and cramp with severe diarrhea, and deaths occurred within 36 hours.

Pharmacological Effects

The alkaloid appears to affect principally the digestive and nervous systems, although skin lesions have been recorded, Symptoms which have been frequently mentioned for different species are enteritis, characterized by constipation, followed by a profuse diarrhea, epidermal suppuration, dilation of the pupils, convulsions, and a slowly progressing paralysis with a fatal termination. The extent to which the solanadine is responsible for promoting the nervous symptoms does not appear to be known.

According to Cornevin, solanine is excreted slowly from the body and the inges-

Vet. Rec., 1943, 55:39, p. 359.

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[1] Chesnut, U. K., and Wilcox, E. V. (1901). Stock poisoning plants of Montana. *U. S. Dept. Agric. Bull.* 26.

tion of comparatively small quantities of the alkaloid over a long period may result in a cumulative toxicity.

Solanum nigrum, one of the 1600 species of the Solanaceae—night-shade family. The common potatoe, *Solanum tuberosum*, is a member of this family

Outline of the Experiment

Three groups each comprising four 18-week-old White Leghorn × Rhode Island Red pullets were used for the experiment and accommodated in individual cages in a battery house.

TABLE I—RATIONS FED TO THE GROUPS

	DAILY AMOUNTS PER BIRD IN OUNCES		
	Group 1	Group 2	Group 3
Balanced laying mash.....	4.0	4.0	4.0
Green potato leaves and haulm..	2.0*	—	—
Uncooked green potato sprouts..	—	2.0*	—
Cooked green potato sprouts.....	—	—	2.0*

*Dry matter approximately 0.46 ounces.

The potato leaves and haulm, and the uncooked potato sprouts were finely minced before being mixed with the meal allowances and fed as wet mash. The potato sprouts fed to Group 3 were boiled in a small quantity of water which was used to make the wet mash when the sprouts were subsequently mixed with the meal. The daily rations were provided for all the groups in two feeds.

Some difficulty was experienced at the outset in persuading Groups 1 and 2 to eat the prescribed daily amounts, but after 10 days they had become accustomed to the new rations, and the full quantity was consumed until the end of the experiment after 112 days. The birds did not attempt to separate the components of the rations and appeared to find both potato tops and sprouts quite palatable. The excreta by comparison with that of control birds in adjacent cages on full mash rations was of normal physical consistency throughout and at no time was there any suggestion of scouring. During the course of the experiment all the birds came into production and although the scale of the test does not permit of quantitative evaluation, the egg yield was consistent with normal expectations. No deaths occurred and the health of all twelve birds, as judged by external appearance, was unaffected by the rations fed.

Discussion

An account has been given of a feeding trial in which green potato haulm and leaves, and cooked and raw green potato sprouts were included in the rations for laying pullets at the daily rate of 2 ounces each. During the experimental period extending over four lunar months, the palatability of the rations and the health and productivity of the birds were unimpaired by the addition of any of these materials. The proportion of greened tissue or of sprouts does not form more than 10% of the total weight of such tubers. In the case of an extreme daily diet containing 12 ounces per head of green or sprouted potatoes, the quantity of greened tissue or sprouts eaten would not exceed 1.2 ounces (fresh weight), per bird, *i.e.*, 40% less than the amounts of sprouts or haulm included in the experimental rations.

The present experience indicated no harmful effects following the prolonged intake of solanine and it would seem that poultry keepers with access to supplies of green or sprouted potatoes can safely feed them to adult birds. The results of recent laboratory and field trials have clearly demonstrated that where potatoes are used for poultry feeding they should be cooked as raw potato starch is poorly digested by fowls. If therefore as an additional precaution the residual water from the cooking of green or sprouted potatoes is discarded, the poultry keeper can confidently feed them to his stock without the necessity of first removing the sprouts or greened tissue.

The Use of Sulfonamide Compounds in Veterinary Practice*

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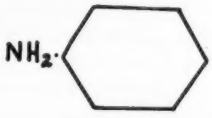
THE advent of sulfonamide therapy in the management of certain types of infectious conditions promises to rank in importance with such major advances in medical science as the introduction of anesthetics, the discovery of the vitamins, the administration of vaccines and the employment of blood and plasma transfusions. Its introduction and wide use in the field of military medicine at a time when the world is embroiled in the greatest and most destructive conflict that has ever befallen the human race seems almost divinely fortuitous. Because of sulfa drugs, hundreds of thousands of soldiers will survive wounds and disease which in earlier wars would have left them buried on foreign soil. This



Aniline

and other modern miracles of medicine and surgery will unquestionably change entirely the percentage figures of those dying of wounds and disease, as well as of those permanently crippled.

As has so frequently been true of great discoveries, the recognition of the value of sulfanilamide as a medicinal agent did not come until nearly 30 years after it was first synthesized by a student named Gelmo in 1908. Even then, its recogition came in a round-about fashion, in the wake of the discovery of the anti-streptococcic value of prontosil in 1935 and 1936.

Following the early successes with prontosil and sulfanilamide, new sulfonamides were synthesized in considerable numbers, a procedure which is still in progress. To date there have emerged some half-dozen compounds which have gained a permanent place in our armamentarium, or at least a place they will hold until something superior is developed. Even now, the supremacy of certain sulfonamides is being challenged by such new agents as gramicidin, penicillin, clavacin and other products of microbiotic origin.

The chemistry of the sulfa drugs is relatively simple, all being formed by the substitution of various radicals for the OH group of sulfanilic acid, which in turn is built by attaching the radical $SO_2 \cdot OH$ in the *beta* position of the benzene ring of aniline.

Chemically, sulfanilamide is para-aminobenzene sulfonamide, formed by replacing the OH of sulfanilic acid with an amino group (NH_2). The other sulfa drugs are

Sulfanilic Acid

formed by replacing one H of this amino group with such radicals as pyridine, thiazole, guanidine, etc.

In the body, a certain amount of acetylation of the NH_2 group in the original aniline ring occurs. This acetylation reduces the effective blood level of the drug, since only the free drug has an important germicidal effect.

While many marvelous things have been accomplished by the judicious use of these agents, it is equally true that their employment may be fraught with danger. Deaths have resulted from damage done by certain of the sulfa compounds, sometimes traceable to idiosyncrasies of the patient but more often to lack of experience or care on the part of the clinician. The toxic effects most frequently mentioned in human medicine are nausea, headache, cyanosis, psychoses, leucopenia, renal injury and blockage of the urinary channels.

Similar effects may be observed in animals, although they seem to be less common and less important. With reasonable care

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in dosage and duration of treatments, veterinarians, in general, seem to have reported few, serious, untoward effects.

Mode of Action.—The exact method by which sulfonamides act to inhibit or retard bacterial multiplication, is not known with certainty. The current opinion is that these drugs, in low concentrations, interfere with certain enzyme systems necessary to the multiplication or survival of certain bacteria, thus permitting the normal defensive forces of the host to accomplish destruction of the microorganism. In higher concentrations, such as are attained in topical applications, it seems probable that the drug exerts a bactericidal rather than a bacteriostatic action. It has been observed that certain growth factors necessary to the life of bacteria, notably para-amino-benzoic acid, may, if present, greatly reduce the efficacy of the sulfonamides. Since these substances are usually abundant in pus and necrotic tissues, the importance of ridding the wound area of detritus, before applying the sulfonamide, becomes apparent.

In selecting the particular member of the group to employ in any given case, one should be guided by certain principles regarding specificity of action, rate and regularity of absorption and excretion, accessibility of the infection, relative toxicity of the drug, inhibiting factors—anatomical or chemical, cost of treatment, etc. For example, it was early recognized that prontosil and its residual product, sulfanilamide, show a remarkable specificity for hemolytic streptococci, but low toxicity against many other pathogenic cocci. The search for more specific agents has made substantial progress and is still going on.

Four general plans of treatment with sulfa drugs are widely used at present:

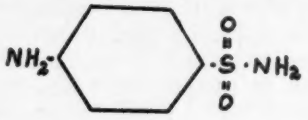
1. Topical or local use, designed to prevent or destroy infections incident to wounds, burns, fractures and infections of the eye, external ear and other natural portals of entry. In this group may be included, also, intrapleural, intraperitoneal and subarachnoid injections for the control of infections involving these parts.

2. Enteric use, for the treatment of infections involving the alimentary tract.

3. Internal use, with the object of building up and maintaining a certain level of blood concentration of the drug, thereby reaching infections involving various organ systems through the medium of the blood and tissue fluids.

4. The establishment of similar blood levels with the objective of reaching infections involving the channels of excretion, such as the urinary tract.

Without going into elaborate details concerning the specific properties of the various members of the sulfa group, the following are some of the general properties and characteristics of those now in use:



Sulfanilamide

Sulfanilamide.—This drug is chemically para-amino-benzene sulfonamide. It occurs as a white crystalline substance, soluble in cold water (to the extent of about 1%) and in alcohol. It is neutral to litmus but forms salts with either strong acids or bases. The basic salts, as with those of other sulfonamides, are strongly alkaline (pH 10-11) and irritant to the tissues. For local as well as external use, the pure compound is employed. For intravenous or other parenteral administration, resort is made to neoprontosil which, within the body, releases sulfanilamide.

When administered orally, the drug is quite rapidly and completely absorbed; the peak blood concentration being reached in man and in most animals in four hours. In ruminants the absorption is slower; the peak being reached in about six hours. Elimination is almost entirely by the kidneys, from one-third to one-half being excreted in the acetylated form. The degree of acetylation varies with the species. Within the body the drug is distributed quite evenly through the various tissues, except fat, bone and nerve.

In the routine treatment of wounds in horses in our clinic, sulfanilamide is the drug of choice, since about 80% of such infections appear to be streptococcic. With

any quantity of less than 10gm, no trace of the drug has been found in the blood, hence liberal topical use seems to be safe.

The drug is also very useful by implantation in the treatment of compound factures. It has been found possible to close these wounds and, after implanting generous quantities of crystalline sulfanilamide, to secure very high concentrations of the drug in the wound serum with complete control of infection but without raising the blood concentration materially. Moreover, little if any interference with healing is to be expected, although there are some differences of opinion on this point. Key, Frankel and Burford,[1] after extensive studies with sulfanilamide in fractures, wounds and joints of rabbits and dogs, concluded that no important interference with healing occurs. They believe that the amount of fluid formed in the treated wounds often exceeds that in control wounds but that this is later absorbed. Farquharson and Smith[2] have implanted quantities, up to six grains per pound of body weight, into the peritoneal cavities of dogs without causing death although severe intoxication was evident. Dosages up to two grains per pound of body weight were so implanted without evidences of toxic effects. Necropsies revealed no adhesions or other evidence of damage from the intraperitoneal use of sulfanilamide. Other research workers report similar results, however, severe irritation does follow the use of the highly alkaline salts of some of the sulfa drugs. In our clinic, when attendants accidentally spilled a large amount of sulfanilamide over an extensive laceration caused by an automobile injury, we lost a dog.

In dogs, pyogenic infections appear to run about 50% streptococcic and 50% staphylococcic. Sulfanilamide is used routinely but sulfathiazole may be substituted, or a mixture of the two may be used.

Internal use of sulfanilamide is of great value in equine influenza and distemper, and if given early may abort or greatly reduce the severity of the attack and the tendency toward abscess formation. It is recommended wherever *beta* hemolytic streptococcus infections are known or suspected, or where the nature of the infection is not known. It is the drug of choice in gas gangrene, septic infections, cellulitis and metritis, although its value in clostridium infections is questionable. In man it is given a high rating in the treatment of actinomycosis but it has not proved very useful in cattle.

The dose, according to a dictum voiced by Schnitker,[3] is "the amount that cures the patient." A second dictum of equal importance is to "strike hard at the start, subdue the infection quickly." The general procedure is to give a large initial dose, equal to two-thirds to three-fourths of the daily total, and follow with a dosage approximating one grain per pound of body weight per day. This is divided into four doses given at intervals of six hours. After 72 hours, the blood level can be maintained if the dose be cut in half.

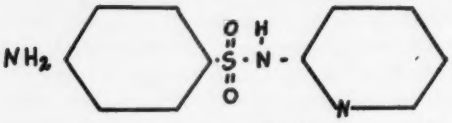
For example, a horse weighing 1,000 pounds would get an initial does of 750 grains, followed by doses of 250 to 300 grains every four hours for the first three days, followed by 150-grain doses for the remainder of the period. Ordinarily, if marked improvement is not seen by the fifth to the seventh day, further administration is not advised. Often smaller doses give excellent results, any blood level above 4 or 5mg percent being therapeutically active. Blood levels of 10-12mg percent are desirable in severe types of infection.

When great urgency is a factor, a prompt establishment of therapeutic levels may be obtained by the intramuscular injection of 125cc of neoprontosil solution at several different sites to be followed by the regular oral dosage. Under such conditions the urine assumes a red color in a few minutes —proof of prompt absorption.

Sulfapyridine.—The second member of the sulfa group to be used widely is sulfapyridine. It was for some time the only other member available and acquired a well-deserved reputation in the control of infections due to staphylococci, pneumococci and meningococci. Against several of these types of infections even better results were later found to follow the use of sulfathiazole, sulfadiazine and perhaps sulfa-

merizine. This, together with the fact that in man the use of sulfapyridine is often accompanied by disagreeable symptoms, has led to a loss of popularity for this sulfonamide in human medicine.

Many of the objections to the use of sul-



Sulfapyridine

fapyridine, particularly the frequent nausea and vomiting, do not apply, at least with equal force, to the lower animals, where sulfapyridine is still a strong favorite in the treatment of such conditions as calf diphtheria, calf pneumonia and other similar conditions. Toxic manifestations which may be experienced include hematuria and blockage of the urinary channels. Under such conditions the use of the drug should be discontinued and an increase in the fluid intake forced as an aid to the solution of excessive crystals of acetyl-sulfapyridine.

In our clinic Farquharson regards sulfapyridine sodium, given in an initial intravenous dosage of 45 grains per 100 pounds of body weight and supported by the oral administration of one grain per pound of body weight per day for two or three days, as almost specific for calf diphtheria. In his report[4] published about a year ago, he states that of 38 animals given but the single initial intravenous dose, only 29% showed a relapse and these animals recovered following additional treatments. Recoveries are often very dramatic even from a single treatment, but the supportive treatment is regarded as very desirable, since it insures almost 100% recoveries and reduces the time required for such recoveries to an average of about five days.

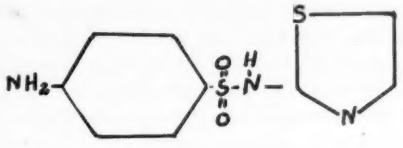
Calf pneumonia, which annually takes a toll estimated by some to amount to 12% in deaths, to say nothing of the permanent structural and functional injury to many animals which survive, is said to respond well to sulfapyridine therapy if it is started early. Unfortunately, irreparable injury and extensive abscess formation may have already occurred before the treatment is started.

Two reports, as yet unpublished, find sulfapyridine superior to either sulfanilamide or sulfathiazole in the treatment of calf pneumonia and its attendant complications, such as calf scours.

A blood level of 5-6mg percent is desirable, and anything above 10mg percent should be avoided. This can be attained on a dosage basis of 0.375 grains per pound for small calves and 0.5 to 1 grain per pound for larger animals. The oral dose is relatively lower in young calves, because of the lack of development of the fore-stomachs. With sulfapyridine the dosage should be cut after the first day, since slow elimination makes blood levels easier to maintain than with sulfanilamide or sulfathiazole. The intravenous use of the sodium salt is an easy way to build up a therapeutic level quickly in the blood. Calves should be watched carefully for toxic effects, such as prostration, inappetence, frequent urination with incrustations, hematuria, hypersensitivity, leg weakness and other signs of depression. The consumption of water should be forced and the drug discontinued if severe symptoms appear. The shortest effective period of treatment should be practiced, since all toxic effects become more common as the duration of treatment is prolonged. Under the most favorable conditions, not more than 50 to 60% recoveries are to be expected.

Sulfathiazole.—Shortly after the introduction of sulfathiazole it was recognized as a very valuable member of the sulfa family, and quickly replaced both sulfanilamide and sulfapyridine for many types of infection. It is more polyvalent, less toxic and more quickly absorbed and excreted than sulfapyridine, and more effective against many of the same organisms. In human medicine it has won a high place in the treatment of gonococcus, staphylococcus and pneumococcus infections, as a urinary antiseptic and in the control of *Esch. coli*, tissue infections. It does not reach the cerebro-spinal fluid well, hence is not recommended in meningococcus infections. It has been claimed to be "the most useful sulfonamide yet employed."

Since the drug is eliminated from the blood more rapidly than is sulfapyridine, more frequent administration is necessary to maintain effective blood levels. This is a disadvantage in many veterinary situations, since frequent dosing of several animals consumes time and is often inconvenient. For this and perhaps other reasons, sulfathiazole has not replaced sulfapyridine for internal use so fully in veterinary medicine as in human medicine. It is highly effective however in the control of staphylococcus infections, pneumococcus pneumonias and



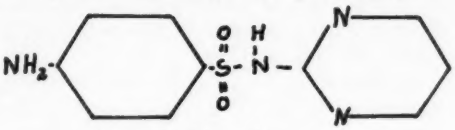
Sulfathiazole

most urinary tract infections. There is said to be some tendency toward sensitization of the patient to a subsequent use of the drug.

It is not equal to sulfanilamide in the control of hemolytic streptococci, but has some value. As an agent for topical application, it ranks high and is often used alone or combined with sulfanilamide. Key[5] used sulfathiazole in 86 clean operative wounds and the two drugs mixed in 78 others, with no wound infection appearing in either group. However, it may be said that aseptic wounds, well protected, need no antiseptics. In veterinary surgery this ideal is harder to achieve than in the average hospital in the human field, but the availability of sulfa drugs should not be used as an excuse for careless surgery. Against staphylococcus and *Esch. coli* wound infections, it is the agent of choice.

A 5% sulfathiazole ointment is an exceedingly valuable preparation in the treatment of conjunctivitis, burns, certain skin diseases and other external lesions where an ointment may be appropriately used. Implantation of sulfathiazole into wounds, compound fractures and into the peritoneal cavity, is also a practical procedure.

Sulfadiazine.—This is one of the more recent additions to the sulfa group but it is not widely used in the veterinary field. Theoretically, it should prove valuable in the treatment of staphylococcus and pneumococcus infections, since it is highly ef-



Sulfadiazine

fective against these infections in man and is quite effective also against hemolytic streptococci. It also ranks high in the control of urinary tract infections. It is decidedly less toxic than either sulfapyridine or sulfathiazole and is more easily excreted by damaged kidneys. Sulfadiazine gives promise of becoming a useful drug in veterinary as in human medicine. However, it still sells at a comparatively high price.

Sulfaguanidine.—A new principle in sulfa therapy is introduced by this drug because, while readily dissolved in the gastro-intestinal fluids, it is not easily or quickly absorbed and so can be used for its effects within the intestines. Here it is found to be

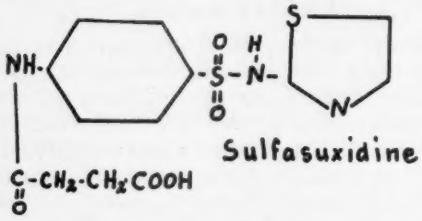
Sulfaguanidine

effective in bacillary dysenteries, calf scours, the intestinal form of canine distemper, enteritis and probably other intestinal infections. Its value in typhoid and paratyphoid infections has not as yet been established. Because it is not readily absorbed through the intact intestinal mucosa, it does not ordinarily accumulate in the blood and tissue fluids in significant amounts. Concentrations ranging from 200 to 1,000mg percent may exist within the intestines, with a blood level of only about 4mg percent. Under certain ulcerative and obstructive conditions, the absorption rate may be much greater.

The daily dosage rate is ordinarily set at about one-half to three-fourths grains per pound of body weight but, because of its low absorption rate, it is ordinarily safe to

use higher dosages. Sulfaguanidine has been found very useful in our clinic in treating the aforementioned intestinal infections, calf scours, enteritis of various forms, the intestinal form of distemper, diarrhea and dysenteries. Its position is now being challenged by sulfasuxidine.

Sulfasuxidine.—This compound is really succinyl sulfathiazole, differing from all the



Sulfasuxidine

others in that the succinyl group replaces a hydrogen group of the original amino radical of aniline, instead of being attached to the sulfanil group. It was developed by Poth, Knotts, Lee and Inui at Johns Hopkins University and was introduced in 1942. The originators found that they could reduce the bacterial flora of the intestinal contents from 10,000,000 to less than 1,000 per gram of wet feces. In human surgery this has been taken advantage of in surgery of the colon, making possible the resection of diseased parts, with immediate anastamosis of the gut, rather than through the usual colostomy. Under this plan, the use of the drug, before and after the operation, fortifies the area against spreading infections from the intestinal contents.

In our clinic extensive use of sulfasuxidine has been started, and to date is giving gratifying results in approximately the same classes of conditions as mentioned under sulfaguanidine. Its absorption rate is even slower than that of sulfaguanidine, and its power to inhibit or destroy coliform organisms even higher.

Herriott[6] reported recently on the prevention and treatment of infectious calf scours with sulfasuxidine in herds where the disease existed in acute form, with gratifying results. He found that treatment given within the first 12 hours of life was a valuable prophylactic measure in a herd which, without treatment, suffered a 50% loss. Treatment delayed until after symptoms developed responded well but with some losses.

Drugs of this class have given variable results in the treatment of coccidiosis and other protozoan infections of the intestines, but many believe the control of bacterial invasions accompanying coccidiosis, plus a possible specific action against the coccidia themselves, justifies the use of sulfaguanidine or sulfasuxidine.

Bryan[7] found 10 grains of sulfasuxidine per day safe in cats and small breeds of dogs and 60 grains daily tolerated well by the larger breeds. He states that two or three times these amounts can be given without causing toxic symptoms. In his experience it is useful in controlling bacillary dysenteries and food poisonings in dogs and is particularly valuable in dysenteries of puppies. In canine distemper it has some value in controlling the intestinal symptoms but, due to imperfect absorption, is not recommended for the catarrhal, respiratory or nervous forms in which sulfathiazole gives much better results.

A feature of the use of the intestinal antiseptic sulfa drugs is the reduction in vitamin factors synthesized by intestinal bacteria. In cases of prolonged treatment, the reduction of the B group and of vitamin K may conceivably bring about some need for replacement therapy.

Other Sulfa Drugs

Sulfacetamide.—This is an acetyl substitution product of sulfanilamide and is not an example of acetylation, since the acetyl group is attached to the sulfanil group. It has not been widely used in veterinary medicine but in human medicine has been found very effective in infections of the urinary tract, including gonorrhea.

Sulfamerizine.—This compound is the mono-methyl derivative of sulfadiazine. It is heralded as a wonder drug in human medicine but to date we know of no tests of its value in veterinary medicine. A dimethyl derivative has also been synthesized under the name of sulfamethazine. Both are much more soluble than sulfadiazine—in both the free and the acetylated form. Each gives higher blood concentrations, on the same dosage basis, than does sulfadiazine. In toxicity tests on dogs and monkeys,

Welch found no tissue changes unless the 8-hour average blood concentration was in excess of 30mg per 100cc of blood.

Hall and Spink[8] have recently reported on 116 cases treated in the University of Minnesota hospitals with sulfamerazine. Included were 40 cases of pnemococcus pneumenia and bronchitis, 33 streptococcus infections and three meningococcus infections. These three types of infections responded as well as those treated with sulfadiazine. Staphylococcus infections were not as well controlled as with sulfathiazole. The advantages of sulfamerazine are: (1) less is required to maintain effective blood levels, (2) there is less likelihood of toxic reactions and less danger of renal injury because of the greater solubility of the free and acetylated forms of the drug, and (3) because of its relatively high solubility in water, it can be given parenterally without employing the sodium salts. On the whole, sulfamerazine seems to fill a useful place, largely in the same field as its mother substance, sulfadiazine.

Methods of Administration of Sulfa Drugs

Quick establishment of an effective blood concentration can be attained by the intravenous injection of the sodium salts of sulfapyridine, sulfathiazole, sulfadiazine and sulfamerizine. Care should be used in these injections to prevent leakage of the solutions, since they are highly irritating to the tissues. Sulfanilamide is introduced parenterally in the form of prontosil or neoprontosil.

All oral dosages may be given in capsules or with the stomach tube, tablets not being recommended unless tests show them to be easily disintegrated or promptness of action is not important. Compressed tablets often resist solution for a long time and greatly delay the absorption of the drug. Under some conditions mixing the powdered drug with the feed is a practical method of administration.

In conclusion, it may be said that several of the sulfa drugs have established themselves as exceedingly valuable agents in the veterinary field but, like most valuable drugs, they have limitations. When used in the treatment of conditions for which they are adapted, the results are likely to be gratifying but, along with their use, we must employ reasonable judgment and discretion, and forget any ideas we may have entertained that they are panaceas.

Sulfonamides of Choice in Controlling Specific Infections

Sulfanilamide

General wound infections
Open fractures
Hemolytic streptococcus infections
Cl. welchii infections
Equine influenza

Sulfapyridine

Calf diphtheria
Calf pneumonia
Pneumococcus pneumonias
Staphylococcus infections

Sulfathiazole

Staphylococcus infections
General wound infections
Skin infections
Urinary infections
Pneumococcus infections
Conjunctivitis

Sulfadiazine

Pneumococcus infections
Meningococcus infections
Staphylococcus infections
Urinary infections

Sulfaguanidine—Sulfasuxidine

Bacillary dysentery
Calf scours
Intestinal infections
Coccidiosis

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Preliminary Requirement for Municipal Meat Inspection*

By J. W. BUTLER
Helena, Mont.

NO NATION has ever been in the vanguard of progress whose people did not get an adequate supply of meat proteins. Without doubt an adequate protein food supply has had a very definite part in the building of the United States. Without such an adequate protein food supply, it is questionable if we would have progressed as we have because protein plays an important part in the development of the human mind.

Food alone is not the all-in-all of human health and happiness, but it plays a much more important part than is realized at this time. I view with alarm the recent proposal that we be placed on a vegetable and grain diet. Vegetables and grains are necessary but without an adequate supply of animal protein, within 50 years our nation will deteriorate into a fifth rate nation. It doesn't make so much difference to mature persons but to growing children an adequate protein supply is definitely essential and animal proteins contain all of the known essential amino acids. There is no one vegetable or grain that contains all of these amino acids. The soybean comes nearer to supplying them than any other single grain or bean, but even the soya, which have been termed the "milk of Manchuria" do not contain all of these essential amino acids.

In animal life we see the problem of inadequate nutrition probably earlier than it is seen in the human family. We know definitely that when an animal is brought from a poor to a good food environment that that animal as the stockmen say: "Blooms like a June rose." We know that undersized steers brought into Montana from Mexico, where they live in a poor food environment, grow very rapidly. Climate also has a marked effect upon the development of animal life. Growth is stimulated by sun and wind as well as by food that is eaten.

I ask you men to fight for what it means to the children of our country, not simply for the money that may be in the business of supplying animal proteins—to use your every endeavor to supply our people with an adequate supply of animal protein.

One does not have to consume a T-bone steak to get animal protein. Milk, cheese, eggs and such products contain animal protein. Nature has provided animal and, in most instances, bird and fish life with the ability to convert vegetation into what we term animal protein. Of all animals, the ruminant is the most productive in this respect.

I am a sanitarian and a veterinarian. That is my vocation in life. I think in terms of health and nutrition and am irrevocably opposed to any governmental agency placing obstacles in the way of the processor of animal proteins. It has taken years of constant endeavor to build up a system of meat and milk inspection to provide for a safe food. Many of these regulations are being thrown into discard and the result, if continued, will be a nutritional catastrophe.

All of the regulations which have been in effect governing the production of meat products and milk have been initiated for the single purpose of providing a safe, clean, wholesome food product. Many of these safeguards are being disregarded. Federal regulations, instead of preventing, have had a tendency to build up a so-called black market. Quotas to the legitimate packers have been restricted, but in many instances farmers have been permitted to sell their produce without sanitary precautions. I am just as much for the farmer as I am for you gentlemen, but I am opposed to any regulation that will permit the sale of unsafe or unclean food products by anyone. Many of these Federal restrictions not only will not help the farmer but most assuredly will interfere with our people securing an adequate food supply—which is neither fair to the individual nor to the country at large.

There is a very definite way to prevent black markets and to provide for an ade-

*Excerpts from an address at a meeting of the Montana Meat Dealers Association, June 28, 1943.

quate distribution of meat products. That way may be provided by meat inspection and meat grading. People can be assured of a safe meat product and a properly graded product, if all meat sold in a community is slaughtered subject to competent inspection and grading. Such inspection will provide for a healthful production, and grading will provide for definite quality standards.

Municipalities should provide for proper inspection and grading of all meat sold within their jurisdiction. I am not particularly in favor of municipal abattoirs. Commercial plants may be operated just as effectively as those municipally owned. Where meat inspection and meat grading is compulsory, the municipality should enter into a definite agreement with the local slaughterers to establish custom kill operations so that any farmer or any producer can bring in a live animal and have the animal slaughtered, inspected, graded and stored for an established price that is fair. In the great majority of instances where there is a reasonable volume, an animal can be slaughtered, inspected, graded and stored for a lesser sum, at a slaughter house where inspection is maintained, than on the farm, and there is no comparison insofar as cleanliness and disease control are considered.

The greatest objection to compulsory meat inspection and grading comes from the industry itself. It does not come from the housewives or consumers. Insofar as meat inspection and grading is concerned the main objections come from those who are in the business of slaughtering and selling meat and meat products. Some operators feel that inspection would interfere with their legitimate business and that the establishment of meat inspection would give the larger operator a monopoly, or at least a control, over the business. This question of monopoly can be very easily taken care of by the municipality by requiring the slaughterer to do custom killing at a definite established price. This price should be based upon the local labor and overhead slaughtering costs.

Before a meat inspection requirement

A study of quality in lamb and mution at the Army School of Meat and Dairy Hygiene, Chicago

can be put into operation, the people of the community must demand it and the city officials must agree to it and to enforce the requirements. The majority of the operators also must want inspection and grading. We know very definitely that without the support of the people and of the municipality and the majority of the operators, no food control or inspection system may be put into practical operation. However, before any new system can be put into effect, the people must be educated and informed of the necessity and desirability of that system and they must want it.

A system of meat inspection and meat grading will not only do much for the upbuilding of the health of a people of a community, but will bring added incentive in the desires of the people to improve their community, It, also, will make unnecessary many laws that are now on the statute books to prevent the stealing of cattle. If all animals had to be slaughtered under official supervision, it is hard to conceive of a man bringing in a stolen animal for inspection.

No state agency can put into practical effect any restriction or regulation that does not have the support of the people. In a state the size of Montana, it is questionable if, at this time, any statewide meat inspection regulation or law could be enforced so as to cover each and every town or hamlet in the state. It is possible, however, for municipalities of any size to provide and carry out the practical operation of an adequate system of meat inspection and meat grading. Official meat inspection and official meat grading may be put into practical operation in any community where there is sufficient desire by the people. Such a system will do more to provide an adequate supply of meat protein, meat foods and do more to prevent black markets than any other factor that I know.

* * * *

In feeding cobalt sulphate it is best to mix it with common salt, using one ounce of the sulphate to each 100 pounds of salt, although about one-half that amount of cobalt is probably sufficient to prevent a deficiency.—*Michigan Experiment Station.*

Kernkamp and Roepke administered sulfaguanidine to 52 pigs affected with enteritis. Sixty-nine per cent of the animals recovered. Only 16% of 31 controls lived. Under field conditions 92% of 133 pigs similarly affected recovered. Under the conditions obtaining in veterinary practice the use of this remedy gave similar results in 333 animals suffering from enteritis. The daily dose was 0.07 to 0.44gm per kg. of body weight. One-half the dose was given in morning; the other half at night. In toxicity trials no ill effects were observed from doses of less than 0.66gm per kilo.

* * * *

Surgery, not rationing, may be the answer to the meat shortage problem, according to J. F. Bullard and F. N. Andrews of Purdue University, who have announced they have been able to develop heavier steers by removing the animals' thyroid glands. Twelve steers, minus thyroids, gained an average of 2.6 pounds a day in feeding tests. This compares with weight gains of 1.8 pounds daily by "normal" steers. The increased weight gain continued for six weeks after the operation—then began to taper off. . . . Conversely, the 1942 *Yearbook* of the Department of Agriculture suggests giving steers extra thyroid.—*Nat'l Provisioner.*

* * * *

Thiamine Stability in Pork

In a report presented at the autumn meeting of the American Chemical Society results were given on the preliminary studies[1] on the stabilization of thiamine in dehydrated foods. It was found that although thiamine in dehydrated pork is reasonably stable below 100° F., its destruction is accelerated by higher temperatures. Earlier it had been discovered that when a product was made of one part of mixed cereal and two parts of the fresh meat that thiamine was definitely more stable even at 120° F. If a lesser proportion than one-third cereal were used with the pork in the dehydrated food the vitamin became less stable.

[1] Robinson, H. E., E. E. Rice and H. W. Schultz, 1943. Preliminary studies on the stabilization of thiamine in dehydrated foods—*Nutrition Research Laboratories,* Swift & Co.

Breeds of Domestic Rabbits

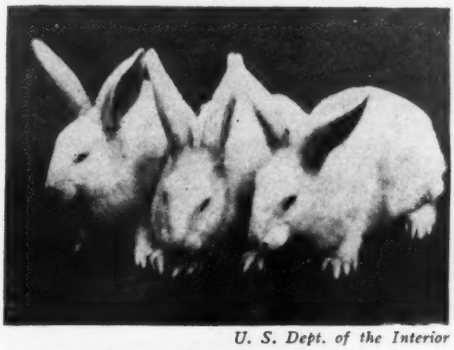
By WILLIAM C. JAMISON
Kansas City, Kans.

THERE are 10 well known breeds of domestic rabbits, the original stocks of which were derived from almost as many countries. These are Angora, Belgian, Dutch, Himalayan, lop, Siberian, Patagonian, silvertip, Polish and Flemish. Their characteristics are as diverse as their origin. They vary in colors through every grade, shade and mixture, from pure white to all black; in coat from the closest fur to long silky hair, capable of being woven; in style of ears from the prick ear, erect, small and almost as stiff as metal to the flappy, broad, soft-skinned ear of the lop, which hangs to the ground. The development of particular characteristics and markings and their maintenance are made possible by the remarkable fecundity and adaptability of the animal.

The lop-ear is the oldest variety of the fancy rabbit, having been bred from the English wild rabbit and shown in England over a century. Its most marked feature is the abnormal ears; each 11 to 12 inches in length and six inches in width. The ears fall gracefully from behind the inner corner of the eye, with the convex surface outward; towards the root the ear is narrow and thick, and becomes abruptly broader and proportionately thinner towards the tip. The body in this breed is rather low at the shoulder and there is a dewlap. The color varies but the markings should be uniform. A large lop weighs 11 pounds. This is the only variety which requires artificial heat for its full development and, although the oldest breed, is so entirely artificial that it is maintained and perfected only by the utmost care.

The Belgian, although commonly called Belgian hare, is a true rabbit. It is of large size (10 pounds) and lustrous sandy brown in color. Its body is larger in proportion to its weight than that of any other rabbit and the hind legs are strong, long and straight. The head is rather broad, tapering to the nose; the ear about 5½ inches long, thin and transparent and the eye brown and bright. The flesh is excellent food. Between 1895 and 1900, this rabbit was extensively introduced to the western United States.

The Dutch rabbit, derived from Holland, is one of the smallest of the fancy breeds, averaging not above four pounds. Its hind quarters are solid black, or blue; or lemon, or rarely tortoise-shell, except the toes of the hind feet, which are white. Its forebody and forelegs are white; it has a white nose and white blaze narrowing to a point on its face between the ears. The whole color areas must be absolutely free from black or white hairs, and their borders clear and sharply defined. They are a very hardy race and excellent mothers.



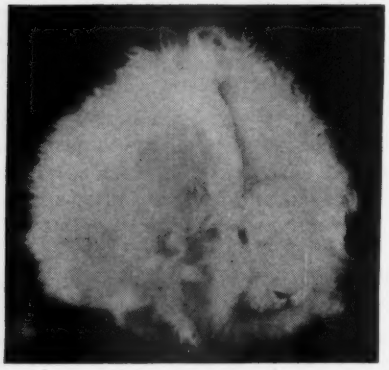
U. S. Dept. of the Interior
Young White Flemish Giant

The Angora, a curious long-bodied rabbit, is a native of Asia Minor and, like the Angora goat and Angora cat, has a long silky coat, so long that it can be combed or clipped periodically, and the wool woven. The hair is all white in typical examples, though some times black or fawn; and of the two lengths, the undercoat woolly and short, the outer long and hanging in semi-curls all over the body. When the wool is white, the eye is pink. In other varieties, it shades accordingly. They average about nine pounds in weight and are hardy.

The Siberian rabbit is bred mainly in France and is quite prolific. It is a cross between the Angora and the Himalayan,

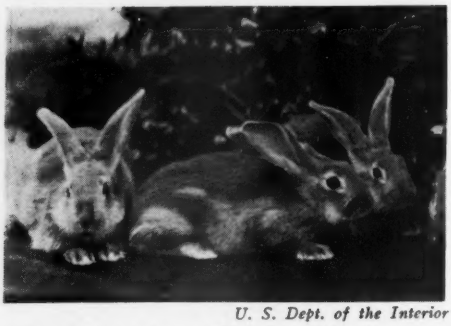
having the long silky hair of the one and the dark points of the other.

The Himalayan's native home is northern



Am. Nat'l Fur and M'k't Inl.
Angora rabbit in full coat

China and Tibet. It is bred in Europe for the value of its skin. The limbs, nose, ears and tail are black; the rest of the body white. Because of the black tipping the pelt is sometimes called mock ermine. The eye



U. S. Dept. of the Interior
Part of litter of six of New Zealand Red doe

is a singularly rich golden crimson, bright and fiery. These rabbits breed, as a rule, very true to type, and are smart, neat, hardy and docile. They vary in weight from four to six pounds.

The Patagonian derives its name from its great size alone, since it is really little other than a wild rabbit, bred to weigh 12 to 16 pounds. The same may be said of Flemish giants, some specimens of which weigh up to 18 pounds. They grow quickly and are profitable for market.

The silvertip is a fancy breed, characterized by upright ears, large prominent eyes, well-formed body, and a coat evenly silvered with about 25% of light hairs. When first born, the silver grays are a slate blue and, after about a month, they look quite black but at their first molt this changes to a real silvering or light color, which is perfected by the second molt when they show the much-desired blue tint. The silver browns are a cross produced from silver-gray bucks and deep-colored Belgian does. The cream or fawn varieties result from other cross breedings. They are medium-sized rabbits, seven pounds being the approved weight.

The Pole is a delicate, little, all-white rabbit, often weighing only three pounds which, in its wild state, inhabits Poland. However, it is distributed all through Switzerland and France, especially in Provence. The ears are short, upright and soft, and the eyes are light red.

Due to the increase in the number of rabbit breeders, precipitated by war time shortages of other meats, the veterinarian must be prepared to advise prospective breeders on the basic differences in the several breeds. The foregoing brief descriptions were designed to provide such information in a concise form.

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Between the extreme of practical reports with little scientific backing, and the extreme of highly technical research papers with little immediate application (both valuable in their way), lies the happy medium of discussions elucidating the practical application of sound scientific knowledge.

★ ★ ★ BUY WAR ★ ★ ★
STAMPS AND BONDS

Veterinarians and Vocational Agriculture Instructors

By F. D. GENTRY
East Lansing, Mich.

IN some communities veterinary practitioners and vocational agriculture instructors fight each other in an underhanded sort of way, which reflects no credit on either profession. The vocational agricultural instructor is often accused of being a "quack", and rightly so. On the other hand, the veterinarian is often justly accused of lacking an interest in vocational agricultural students. This attitude is atypical, unnecessary and unfortunate.

The veterinarian's chief purpose is conserving the normal health of the livestock of the community. The principal duty of the vocational agricultural instructor is to train the high school boys of the community to become successful farmers, and to instill in them a keen interest in farming as a career. Neither the veterinarian nor the instructor can succeed if either of the programs fail. The success of the veterinarian depends upon his clients having an adequate income to pay for his technical services, while that of the vocational agriculture instructor depends upon the success of his students as farmers after graduation from high school.

Having taught in a community where there was complete co-operation between the two professions and observing the fine results that attended such co-operation, and at the same time having observed, in other communities, the tragedies of the lack of co-operation, I feel that, being now a veterinary student with an appreciation of the veterinarian's viewpoint, I may offer some suggestions that may be of benefit both to veterinarians and vocational agricultural instructors.

The clients of the veterinarian of 10 years hence, in large part, are now being trained in high schools under the Smith-Hughes program which locally is in charge of vocational agricultural instructors. These boys are being trained in classes and on the farm by the aid of the latest publications of the U. S. Department of Agriculture and the state agricultural extension services. Practical knowledge is taught by field trips and supervised farming practices (projects) in several fields, which include the conservation of soil and its importance in livestock feeding, farm crop production, livestock production, care and repair of farm machinery and buildings, home gardening and fruit production, farm management and economics, and a host of other farm practices which have proved successful.

Dairy project boys on 1000-mile educational tour

The value of a technical knowledge of agriculture is indicated by a survey of 183 Indiana farmers in 1932*. The farmers were scored on the agriculture information they possessed as judged by their practices and replies to questions concerning farming and live stock raising.

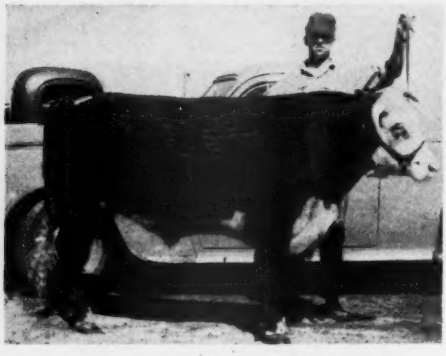
Range of score	Number in group	Actual Labor income
90-100%	17	$868.00
80-89%	50	761.00
70-79%	53	482.00
Under 70%	63	371.00

Any veterinarian can realize that those in the upper income brackets, i.e., who had more knowledge of farming, would be better clients than those in the lower brackets who knew less about it. It is the mission of the vocational agricultural teacher to train boys for the higher brackets in both information and income. He thus contrib-

*Bul. No. 369, Purdue Univ. Ag. Exp. Sta., Aug., 1932, p. 7.

utes to the future improvement of veterinary practice in the community.

Although no one would question the value of technical training for future farmers, there is considerable criticism of what the vocational agricultural instructor teaches in the matter of animal disease. Vocational agricultural instructors are not trained to the extent that they can diagnose livestock diseases with any considerable degree of accuracy nor should they attempt it for it is out of their field; however, they should teach some of the fundamental principles of livestock sanitation and disease prevention, as well as some of the most obvious



Vocational agriculture student showing a Hereford at a Missouri baby beef show

symptoms of certain diseases. This is necessary in order that the future livestock raiser will be able to recognize, in time, that an animal is sick and call a veterinarian before the ailment has progressed to a stage where recovery of the animal may not be possible. Every farmer should realize the economic significance of livestock losses, as well as some of the dangers to himself, his household, and the community, of animals that are communicable to man from contagious diseases. This the vocational agricultural instructor stresses. If he attempts to go further than this and teach quackery the veterinarian should first contact him in a friendly way with something constructive to offer. This will ordinarily be successful as the instructor is out of his depth and usually knows it, or will soon find it out. An offer to cooperate with him and a suggestion that he not attempt the treatment of sick animals, will find him co-operative in most cases, for he is not knowingly attempting to cut the veterinarian's throat. He gets no compen-

Vocational agricultural instructors are not trained to diagnose livestock diseases—it is out of their field, they should not attempt it

sation for such acts. Rather, he is attempting to assist his students with their projects and has simply gotten away to a bad start. By making some concessions to the vocational agricultural boys while in high school, the veterinarian will be making friends whose influence counts and, at the same time, he will be building solidly for the future when these boys will have become the leading farmers of his community.

In Carthage, Missouri, where I taught vocational agriculture for the past two years, both Drs. C. C. Moore and W. J. Houser the two local veterinary practitioners, were elected honorary members of the local Future Farmers of America, in appreciation of their keen interest and assistance, by the 55 boys studying vocational agriculture.

Such a plan, I am confident, will build the vocational agriculture program and improve the quality and the number of any practitioner's clients over a period of years.

Autobiography of a Veterinary Practitioner

By E. T. BAKER, Moscow, Idaho

XXII

Small Town Meat Inspection

LAST month in counseling against the promiscuous joining of societies and clubs when a veterinarian locates in a community, we did not mean to imply that he should ignore or shirk civic movements that touch his field more or less directly. An illustration is municipal meat inspection. Every so often most small cities get all "het" up over the question of local meat inspection, usually when some particularly nefarious conduct of the local slaughtering fraternity has accidentally come to public knowledge or when some better than the mine-run of citizens has been made ill by something they ate at the Y.M.C.A. or K.C. banquet. Or maybe it is a black market that has roiled the placidity of some good citizens whom Charlie the Butch doesn't entirely trust.

The veterinarian should by the very nature of his training be a counsellor and guide for such movements, but always in the backfield, never as a passer or runner. Then after the ordinance is so worded that he alone, of all the citizens, can qualify for the position of meat inspector, he can be properly surprised and modest and sometimes a wee bit reluctant to accept the offer of the position by the mayor and the city council.

About 13 years ago our city council passed a very good meat inspection ordinance. Due to the well advertised depression that came along about that time, it was compelled to lie in state for lack of available funds to enforce it.

The writer was asked by the council to consider the job on a fee basis, so it would be self-supporting, but gracefully declined. We could vision a financially-anemic rancher driving into town with a dressed pig reclining on the rear seat of an ancient but still dignified Model T. Then, after we had inspected the graceful form of what had once been Mrs. Chester White's favorite son, we would have to request a two-bit fee.

In those days of three-cent hogs, a good sized carcass would bring in trade only four pounds of tobacco, a quart of moonshine, one pound of coffee, fifteen cents worth of sugar, and an all-day sucker for each of the younger generation.

The Ordinance Revived

Several years ago, women's clubs in Idaho began to complain about the kind of meat available for home consumption. It was charged a large part of our beef came from deceased Bang's disease reactors, while our healthy cattle were shipped elsewhere. There was little, if any, complaint about tuberculous beef, for that disease now is practically non-existent in our cattle. It is fairly common in swine and poultry.

Six years ago, at the request of the city health officer, the mayor and council appointed us city meat inspector on a part time basis, at a salary of $50 per month, to be paid out of the city general fund.

For this, we agreed to inspect all meat brought into town, not federally inspected, and to perform post-mortem examinations at a small slaughterhouse near town.

We have six meat markets, one cold-storage locker plant, and the slaughterhouse mentioned above. At the latter plant, butchers or farmers may have their animals custom killed for the following prices: Cattle, $2, plus hide; veal, $1.25; mutton,

75 cents, plus pelt; hogs, one cent a pound, live weight. This plant is not run by the city. Butchering is done about three times a week.

Inspection Begins

Our first problem was to figure out what supplies would be needed, and how to conduct the work to the best advantage of the butchers, farmers, slaughterhouse operator and ourself.

We intended having a round copper stamp made, but an attorney told us the government had the prior right to this shape, so we designed the following diamond-shaped stamps:

To become acquainted with the work, and brush up on the "lymphatics," we took a trip to Spokane. We might add that after working three years with Doctor Sisson on his anatomy as a student, and typewriting the entire work of 781 pages, with a 43-page index, while spending a few years at Ohio State, we were surprised to find out it would take a 900-page book to contain what we did not know about the subject. Our sincere sympathy to luckless freshmen taking their first examination.

At Spokane, Doctor Zimmerman, federal Inspector-in-Charge at that time, rendered us every assistance in his power, and Doctors Flory, Overhulse and Murray gave us some much-needed pointers on the work.

We make our rounds of the six markets and the cold storage plant between 10 and 12 Monday, Wednesday and Friday mornings. By this time, the shops have sent out their morning orders, and we have had time to make our early country calls.

The markets have three sources from which to secure their meats and poultry: first, from the large packing plants where federal inspection is maintained, and which requires no attention on our part; second, from the local slaughterhouse, and third, from farmers who have "butcher permits." In Idaho, a farmer may secure this permit from the county auditor for an annual fee of four-bits, which is a check on the hides. In our county, about 40 farmers have these permits. Of course, none is needed when a farmer butchers his own stock for his own use.

A farmer may bring a dressed carcass into town with the liver attached, and we inspect this either before he sells it to the butcher, or afterwards. We affix our stamp, which shows he has complied with the ordinance.

We go through the markets three times a week, as above stated, and if we notice any product not fit to put on our own table it is destroyed. We find it takes about three half days a week to inspect the meat and poultry (our city council lacking the penetration of the U. S. Congress was unable to discern a reason for exempting diseased poultry from condemnation) used in our town of 9,000, which includes 2,500 university students and fraternity house bull dogs. About 300 carcasses, weighing around 75,000 pounds, are examined each month, 250 to 800 pounds being condemned.

Most of our "rejected" are due to improper butchering, submaxillary abscesses, spotty livers, bruises and fractures, icterus and emaciation. Even a simple minded country calf, jerked away from its doting mama before it has had a chance to get the colostrom, may be thin at six week of age. Kept in a dark, filthy pen, and fed nothing but skim milk and the hopes of a better hereafter, its meat does not make

very nutritious breaded veal steak with tomato sauce. In poultry, tuberculosis and abscesses are found more frequently than other causes for condemnation.

One rejected carcass we recall is a sample of what may occur on any farm, and its story is a sad and tragic one. This particular rancher had a calico-colored heifer, one part blue shorthorn and two-thirds dynamite. She was a triple-threater, being able to kick, hook and run at the same time. We remembered her quite well, having spent nearly an hour drawing a tube of blood from her for the Bang's disease test. Our assistant had to rope her on the dead run, and it took three of us to snub her up so we could bleed her between "yumps." And yet some kid-gloved officials think a practitioner does not need help to test these wild and woolly critters

One day, the kind-hearted owner noticed this heifer had a bad sore on her hind leg, and getting her in the barn, decided to play the good Samaritan and apply some medicine. He sat down beside her and touched the lesion with some healing balsam. Just what happened next is not exactly clear, for he only remembers getting kicked between the short ribs and the granary door.

After he came to he made a careful inventory to see whether he was still intact, and then he began to grow irritated. He rushed into the house, grabbed his trusty deer rifle, and came back to the barn with a body temperature of around 105° F. in the shade. He evidently shot too low, for the heifer broke her halter rope, and "busted" through the door and up in an old orchard, with the owner trying to keep up. He finally cornered her, and shot again, this time killing her as dead as she will ever be, and then he had to run back to the house to get his butcher knife to stick her. As this was an average farmer knife, it took quite a while even to puncture her hide. He finally got her dressed, with most of the blood still in her various tissues and organs.

We had to turn the carcass down, but helped him dispose of it to some coyote hunters for hound proteins.

During a recent Thanksgiving season, over 6,000 pounds of turkey, and 4,000 pounds of chickens, geese and ducks passed through our markets. A few domesticated rabbits were also consumed. In addition, our mighty hunters, who average nearly 20 miles to the quart, brought into the cold storage lockers 51 deer, 36 elk, two bear and a large number of Chinese pheasants and wild duck.

Advantages of Meat Inspection

An inspector who does not regard himself too seriously can do a lot of missionary work among producers, handlers and consumers. We regard our work as divided among all three types of people.

We find that farmers are eager to receive tips on how to fatten and prepare animals for markets, and being among our clients, we can advise them more freely than could a stranger.

We find the duties pleasant and interesting and, unlike Bang's disease testing which is about the hardest work we have ever performed, meat inspection is more like office practice.

All towns and small cities should have meat inspection. For veterinarians who are interested I append a copy of our ordinance, not as a model of what a small town meat inspection ordinance should be but only as a sample of one that works fairly satisfactory to all parties concerned.

Its advantages may be summarized as follows:

1. It places the meat inspector in the department of health and restricts his qualifications so that a veterinarian must be appointed.

2. It gives the meat inspector his salary out of the general fund, with no fees to collect. The latter system takes more "book work" than time actually spent in doing the inspection.

3. It allows the farmer or owner to butcher his own stock on the farm, and bring it to town with the vital organs attached. This keeps down rural friction, and really benefits the stock raiser.

4. It designates a place where custom slaughtering may be done.

5. It shows some common sense and not too much red tape in safeguarding the consumer.

We might say a fair remuneration for various sized towns would be: 3,000 or

under, around $25 per month; 6,000 or under, around $50; around 10,000, $75; over that, $100 up, depending on the amount of work involved.

In inducing the city council to inaugurate meat inspection, it is far better to allow some club or association to urge this on the council than for the veterinarian to do it. About all we did in our community was to answer a few questions, and then keep out of it.

There is no argument as to the value of meat inspection. In our town the cost to each person is around ten cents per year.

MOSCOW, IDAHO, MEAT INSPECTION ORDINANCE

AN ORDINANCE construing certain words and phrases used in this Ordinance; Providing for the inspection of slaughter houses; Regulating the slaughtering of meat animals and the sale and disposition of meat and meat food products intended for human consumption within the incorporated limits of the City of Moscow, Idaho. Providing for the post-mortem inspection of all animals, the meat products of which are offered for sale in the said city of Moscow; Regulating the manner of inspection thereof; Prescribing the duties of the Mayor, City Council, City Physician and City Meat Inspector; Providing for the manner of designating the places for such inspection; Providing for the disposition of diseased meat animals or carcasses unfit for human food; Making a violation of the terms of this Ordinance a Misdemeanor, and, Providing for the penalty of such violation, and, Repealing all Ordinances and Parts of Ordinances in conflict therewith:

Be it ordained by the Mayor and City Council of the City of Moscow, Idaho:

SECTION 1. That for the purpose of this Ordinance and as a guide and rule of construction, the following words, phrases and terms shall be construed respectively to mean:

1. The words "meat animals" shall be construed to mean cattle, hogs, sheep and goats.

2. The word "carcass" shall be construed to mean any animal slaughtered, the meat of which is sold, offered for sale, or intended to be sold within the incorporated limits of the City of Moscow.

3. The words "meat products" shall be construed to mean any part or portion of any slaughtered animal which may be sold, offered for sale, or intended for human consumption, and shall include any mixture of meat from slaughtered meat animals, as defined in this Act with other food products intended for human consumption.

4. The word "inspector" shall be defined to be any person appointed meat inspector in accordance with the provisions of Section 2 of this Ordinance. Such meat inspector shall be a graduate of a recognized veterinary school, and shall possess the same qualifications as to experience as is now required by the meat inspection division of the United States Bureau of Animal Industry, and any person qualified to inspect meat or meat products by the meat inspection division of the United States Bureau of Animal Industry shall be deemed qualified to be appointed as Meat Inspector under the terms of this Ordinance.

5. Wherever the word "person" is used in this Ordinance the same shall be construed to mean any person, firm, corporation, association of persons or association.

SECTION 2. The Mayor of the City of Moscow, with the advice and consent of the City Council of the City of Moscow, shall, upon the passage, approval and publication of this Ordinance, appoint one or more inspectors of meat and meat products, whose duties are defined in this Ordinance; such inspector shall possess the qualifications provided for in Section 1 hereof.

SECTION 3. The Mayor of the City of Moscow shall, within ten days after the approval, passage and publication of this Ordinance. designate one or more slaughter houses or other places within the corporate limits of the City of Moscow, or, in the vicinity of the City of Moscow, as the place or places for the inspection of any and all carcasses of meat animals, the meat or meat products of which are intended for human consumption and offered for sale, or otherwise disposed of for human consumption within the City of Moscow.

SECTION 4. All animals slaughtered, the meat or the meat products of which are sold or offered for sale in the City of Moscow, shall be slaughtered in a slaughter house which shall be subject to inspection by the inspector or inspectors, provided for within, or by the City Physician, and no meat or meat products shall be sold in the City of Moscow from any animals slaughtered in any slaughter house which has not been so inspected and approved by such meat inspector or city physician, and such inspector or city physician may from time to time adopt such reasonable rules and regulations for the slaughter of meat animals and the slaughter house in which the same shall be slaughtered for the purpose of keeping such slaughter house in a clean, sanitary condition so as to insure the consumer of good, wholesome meat or meat products for human consumption, provided, however, that nothing in this Ordinance shall be construed so as to prevent any farmer or owner of a meat animal from slaughtering such animal on such owner's farm by the owner thereof or by any person under his direction. Any meat animal slaughtered on the farm, the meat or meat products of which are offered for sale in the City of Moscow, shall be slaughtered so as to prevent the meat or meat products of such animal from being contaminated or unfit for human consumption, and, Provided, further, that the carcass of any meat animal slaugh-

tered on the farm shall be subject to inspection as provided in this Ordinance before the meat or meat products of which are sold, offered for sale, or otherwise disposed of in the City of Moscow.

SECTION 5. Any person slaughtering meat animals, the meat or meat products of which will be offered for sale, sold or otherwise disposed of within the city limits of the City of Moscow, shall, within 24 hours after the slaughtering of said animal, exhibit the carcass thereof to the City Meat Inspector of the City of Moscow, at such place as may be designated by the Mayor of the City of Moscow, and such slaughtered animal shall be so exhibited to the City Meat Inspector with the head and vital organs attached and in place, and, by the vital organs is meant the tongue, liver, lungs, kidneys, heart and spleen.

SECTION 6. It shall be the duty of such city meat inspector to carefully inspect all carcasses of meat animals, the meat or meat products of which will be sold, offered for sale or otherwise disposed of in the City of Moscow for human consumption, and if the meat of such anmial is fit for human consumption the same shall be stamped or marked with an appropriate stamp by such City Meat Inspector, and after such inspection, the meat or meat products from such meat animal may be sold, offered for sale, or otherwise disposed of within the incorporated limits of the City of Moscow, and the inspection and approval of the inspector of such slaughtered animal shall be deemed a full compliance on the part of the owner of such slaughtered animal with the provisions of this Ordinance. Such inspection and approval shall be made without charge or expense to the owner of such slaughtered animal.

SECTION 7. Any meat inspector appointed under the provisions of this Ordinance is hereby authorized and empowered to condemn and denature or destroy any slaughtered animal, the meat or meat products of which shall be unfit for human consumption, and such meat inspector is further authorized to condemn and destroy any portion or part of a slaughtered meat animal which may be unfit for human consumption, and any slaughtered animal unfit for human consumption shall be left by the owner of such slaughtered animal with such City Meat Inspector, who shall destroy or dispose of the same in accordance with the rules and regulations governing meat inspection of the United States Department of Agriculture. It being the full intent and purpose of the City of Moscow to fully coöperate with the provisions provided by the laws of the United States and the rules and regulations for meat inspection of the United States Department of Agriculture in order to prevent the use of unfit meat or meat products for human consumption.

SECTION 8. Any meat or meat food products sold or offered for sale or otherwise disposed of in the City of Moscow, which has been inspected and passed by the Department of Agriculture of the United States Government, may be sold, offered for sale or otherwise disposed of in the City of Moscow, without inspection by said City Inspector of the carcasses of the animals from which such meat is sold, offered for sale or otherwise disposed of for human consumption. Provided, however, that such meats and the place where the same are sold or offered for sale shall be subject to all times to re-inspection from time to time to determine the continued condition or soundness and wholesomeness of such meat or meat food products as the City Meat Inspector may deem proper.

SECTION 9. It shall be the duty of the Mayor of the City of Moscow, as soon as one or more places have been designated for the inspection of slaughtered animals within the terms of this Ordinance, and as soon as one or more City Meat Inspectors have been appointed, to give public notice of the place or places where such inspection may be had and of the name or names of the City Meat Inspector or Inspectors, and such notice shall be published in the official newspaper of the City of Moscow, and shall be substantially in the following form:

"Notice is hereby given that under the Provisions of Ordinance No. 669 of the City of Moscow, Idaho, no meat or meat products shall be sold, offered for sale, or given away within the limits of the City of Moscow, without the carcass of the meat animal having been first inspected by the City Meat Inspector in accordance with the terms of said Ordinance, and notice is further given that the Mayor of the City of Moscow, under the provisions of such Ordinance has designated..... in the City of Moscow as the place for such inspection, and that..... has been appointed City Meat Inspector who will make such inspection without charge or fee."

SECTION 10. It shall be unlawful for any person to sell, offer for sale, exhibit for sale, give away or otherwise dispose of any meat or meat products from any slaughtered animal, the carcass of which has not been inspected by a City Meat Inspector of the City of Moscow, or which has been slaughtered in a slaughter house which has not been inspected or approved as provided in this Ordinance, except as otherwise provided, and any person violating any of the provisions shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined in a sum not less than Ten ($10.00) Dollars, and not more than One Hundred ($100.00) Dollars, or may be confined in the city jail not to exceed thirty (30) days, or by both fine and imprisonment.

SECTION 11. All Ordinances and parts of Ordinances of the City of Moscow in conflict with the provisions of this Ordinance are hereby repealed.

The foregoing Ordinance approved on this 5th day of October, 1931.

J. E. WILSON,
Mayor of the City of Moscow.

Attest:
RAY CARTER, *Clerk.*

(To be continued)

Clinical Reports

Veterinary Medicine in Kenya, Africa

Government veterinary officers for Kenya are usually recruited in the United Kingdom. They are members of the Colonial Veterinary Service. There are no local facilities for the training of men who wish to enter Government service as Veterinary Officers; all who wish to enter this branch of the service must possess the qualifications of M.R.C.V.S., or one which is recognized by the Royal College of Veterinary Surgeons of Great Britain.

The veterinary officer in Kenya may be called upon to deal with any of the domesticated animals, such as cattle, sheep, horses, mules, donkeys, pigs, poultry and, to a lesser extent, camels.

The more important diseases found in this territory are:

Cattle.—Rinderpest, bovine pleuro-pneumonia, trypanosomiasis, East Coast fever, foot-and-mouth disease, anthrax, blackquarter, brucellosis, anaplasmosis and redwater. Tuberculosis is not prevalent.

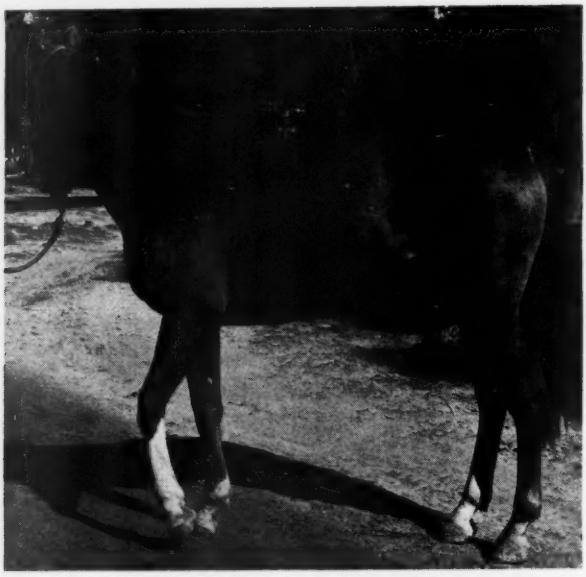
Sheep.—Sheep scab, Rift valley fever, heartwater and bluetongue.

Horses.—African horsesickness, biliary fever (piroplasmosis) and lymphangitis.

Pigs.—Swine fever (hog cholera).

Parasitic diseases are prevalent in all animals. Dipping of cattle and sheep is much practiced.

Inasmuch as all practicing veterinary officers with few exceptions are employed



TENDINITIS IN AN ARMY HORSE

The illustration shows an army mount with a severe tendinitis due to an injury that resulted when the animal broke through a bridge, pulled off a shoe and severely bruised the flexor tendons. The treatment used was the same as we sometimes used on strains in the 30th Veterinary General Hospital—anesthesia of the injured parts and immediate, controlled exercise. Within a week the lameness had disappeared. Recently a horse was injured by having a flap, nearly two inches wide, torn from the lower pastern region down through the coronary region and into the hoof about one and one-half inches. It was attached only at the lower margin. To have removed it would have destroyed a section of the coronary band. The wound was dusted with sulfanilamide, the flap replaced, then packed with sulfanilamide and a pressure bandage applied. This bandage was replaced eight days later with a tar bandage and the animal shod with a leather pad and shoe over the dressing. Healing was by first intention and but slight blemish of the new hoof remains. About two or three times a month at this post it is necessary to treat animals for contracted heels. Following the practice employed in the 30th Veterinary General Hospital, I have discarded the use of the barshoe. This saves labor and inconvenience and results have been just as good as formerly when a barshoe was used in such cases—Major, V. C.

by the Government, most professional equipment is imported through the Crown agents. However, at times, it is purchased locally. With the exception of tuberculin and mallein, the various sera and vaccines are produced at the veterinary laboratory at Kabete where a veterinary research staff is constantly employed on the production of rinderpest serum and vaccine, pleuropneumonia vaccine and vaccines for the treatment of anthrax, horsesickness, redwater and other diseases.

With few exceptions, there are no private practitioners in Kenya. The low value of stock generally and the long distances to be travelled are the reasons for this.

WALTER BUCHLER

London, England

Cleft Palate in Calf

April 2, 1943, a Holstein-Fresian heifer calf 4 weeks of age was presented to Dr. A. F. Meredith, Lincoln, Kans., for examination. Dyspnea and a copious nasal discharge were very noticeable, also a cane stalk four inches long was protruding from one nostril. Examination of the mouth showed that the palatine processes had failed to develop and fuse, resulting in a direct communication between the mouth and the nasal cavity.

The calf was born in an apparently normal birth from a high producing Holstein-Fresian cow. It refused to suck at birth but soon began drinking milk from a bucket. It drank and grew well for three weeks. However, each time it drank some milk returned through its nose. At three weeks of age it developed anorexia and gradually became emaciated. It died of pneumonia two days after being brought in for treatment. Post-mortem examination showed that two stalks of cane were embedded in the roof of the nasal cavity. Anatomically, the calf was normal in every other respect.

In reviewing the literature I find the condition of cleft palate is rare in cattle, and when it does occur other abnormalities are present, thus such animals do not survive long.

W. H. MEREDITH

Lincoln, Kansas

Roof of mouth of calf with cleft palate

Azoturia with Marked Abdominal Pain

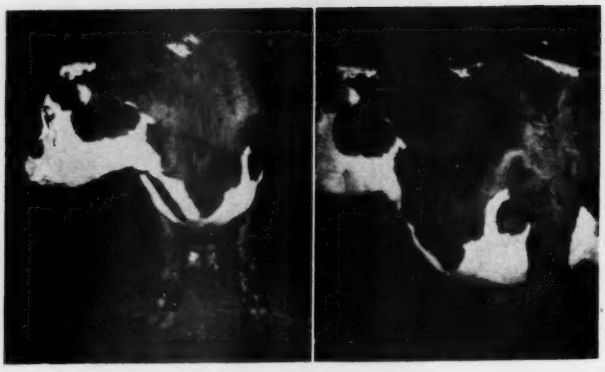
A call was received last spring to see a three-year-old gray mare that apparently was suffering from one of the various forms of colic. However, after I had been on the case for awhile, I discovered that I was dealing with azoturia also. This, of course, complicated matters and I realized I was up against a bad combination. After staying with the animal for four hours, I left her resting easy.

Much to my surprise the mare made a good recovery. However, there were several abscesses developed where I had injected some of my strenuous treatment. These did not prove serious and at last account the mare was doing her share of farm work.

There are two reasons I am reporting this case. In the first place, it is unusual to find these two ailments—azoturia and acute indigestion—together in an animal and, in the second place, it is unusual for a horse to recover when affected by two such diseases—either one of which might easily prove fatal.

REMBRANDT MORGAN

Winfield, W. Virginia



TRAUMATIC PERICARDITIS

Edema of the brisket and dewlap and less often of the whole sternal region is a common but not a constant symptom frequently omitted in discussing this ailment. The illustration shows a pronounced case of such swelling. The owner had noticed the swelling developing for a week before this photograph (flashlight photo) was taken. The calf died 48 hours later and necropsy confirmed the diagnosis.—*Thos. W. Gidley, Malvern, Iowa*

Pressure Necrosis

Such cases as the one here described are not rare but they are often undiagnosed and cause no little injury to the patient.

A 5-year-old Pekingese bitch, weighing 12 pounds, was presented for treatment. There was a history of the dog having had an abscess for quite some time. On three occasions the condition had become acute—the wound finally bursting and discharging a white, creamy pus. The owner also stated that the dog had been twice taken to a veterinarian who had been unable to diagnose the condition.

Examination of the patient disclosed a purulent abscess situated across the middle of the under side of the neck in the form of a running sore. White, creamy pus had matted the hair. The temperature was slightly above normal (102.6°F.). Pain was evident by the fact that it was necessary to have an assistant hold the dog firmly while the operator clipped the hair around the abscess.

At the lateral edges of the lesion a rubber band of the common small size was discovered which completely encircled the neck. It was easily removed.

The band had been buried beneath the skin and white purulent exudate on the ventral surface of the neck, while a line of beginning skin necrosis was revealed where the band had pressed on the top and sides of the neck beneath the dog's thick hair.

After cleansing the wound, an antiseptic powder consisting of one part iodoform to three parts boric acid was applied. This was renewed the following day. An uneventful recovery followed.

Injuries of this sort are probably more frequent than is generally realized. The band could have been overlooked because of the fact that abscesses on the ventral side of the neck are quite common in dogs and are due to a variety of causes, such as canine distemper, wound infection following dog fights, and gunshot wounds.

RICHARD E. HINEMAN

Dighton, Kans.

★ ★ ★ BUY WAR ★ ★ ★
STAMPS AND BONDS

Hydrocephalus in a Foal

A pathological increase in the volume of the fluid in the lateral ventricles of the brain causes an enlargement of the cranial cavity in the developing fetus. Such a condition, termed congenital hydrocephalus, is rather rare and may give rise to dystocia. Hutyra and Marek in describing the condition state "Since during fetal life the bones of the cranium are not yet joined; the cranium enlarges enormously, the parietal and frontal bones bulge, and the orbits are reduced in size, and the head assumes a characteristic shape, the cranium being large out of all comparison with the rest of the head."

A Belgian mare suffering from dystocia was presented to the veterinary clinic of the Kansas State College. Another veterinarian on the preceding day attempted to relieve the condition, with negative results. Straining by the mare was relieved by injecting 15cc of a 1% solution of procaine

into the epidural space. The tail of the mare was bandaged and the external genitalia washed. A manual examination revealed a normal presentation but, due to enlargement of the head, the fetus was unable to pass through the pelvis. A diagnosis of hydrocephalus was made and immediate steps were taken to relieve the condition.

Mineral oil was injected into the birth canal for lubrication as the fetal membranes had ruptured some time previously. The fetus was repelled by the operator and a Benesch fetotome was introduced into the birth canal. The wire saw was passed around the protuberance of the cranium and this portion of the head removed. Because of the partially decomposed state of the fetus the operator was enabled to manually break down the remaining bony structure of the head. Obstetrical chains were attached to the forelimbs and the fetus was removed by traction. The remaining fetal membranes were removed and sulfanilamide capsules placed in the uterus. During the operation the mare went down and she died the following morning without regaining her feet.

The fetus was large and apparently normal with the exception of the head. Measurements taken on the portion removed with the fetotome showed the length of the cranial cavity in the median line to have been 10 inches as compared with about four inches in the normal foal of this breed. Transversely the cavity measured eight inches as compared with a normal of three to four inches. The dorso-ventral measurement could not be taken because of the manner in which the skull was removed. However, the portion cut off by the fetotome was four and one-half inches in depth and must have measured six to eight inches in the intact skull. The cranial cavity was not bilaterally symmetrical, the right side measuring 2½ inches transversely while the left side measured 5½ inches.

Development of the cranial bones was almost complete, only two small areas about two inches in diameter on either side of the median line remaining covered by a thin cartilaginous membrane.

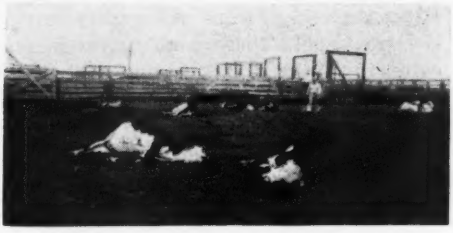
W. V. LUMB

Manhattan, Kans.

Successful Therapy for Cyanogen Poisoning in Cattle

One often hears veterinarians remark that it is useless to make calls to treat prussic acid poisoning in cattle as all animals that have consumed a lethel dose are dead before one can arrive. However, this is not always the case. Veterinarians can save many of these cases of cane or other hydrocyanic acid poisoning if they will but try.

June 28, 1943, a man rushed into the hospital and asked me to hurry out to the T & P



Some of the 22 animals which died of Prussic acid poisoning within 30 minutes

stock pens to see some sick cattle, stating that four cows were already down and several more were sick. After obtaining a brief history I suspected prussic acid poisoning and made preparations accordingly.

These cattle had been shipped in from Marfa in the Big Bend section to Colorado City, Texas, to be sold to stock farmers and local ranchers. In order to reduce the feed bill, the owners decided to make use of the prolific growth of Amaranthus or common careless weeds on the railroad right-of-way and adjacent feed lot pens. As long as they moved the cattle daily to a new area up and down the right-of-way, they had no trouble. However, when this source of pasturage became exhausted, they turned the cattle into adjacent feed lots where the weeds had made an abnormal growth. No trouble occurred until the second morning. This was due to the fact that many weeds were broken down and bruised and prussic acid became available over night in branches that were wilted.

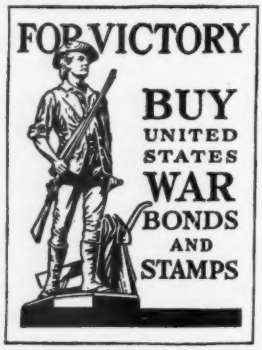
When we arrived twelve cows were dead or down. Considering it inadvisable to treat those that were paralyzed, treatment was begun on the sick animals that were still on their feet. I carried three intravenous

sets and 20 (250cc) bottles of sodium thiosulphate solution. After the hypodermic needle was inserted in the jugular vein, my assistant completed the injection while I started on another case. By this procedure we were able to treat 14 cows within 30 minutes and save 11 of them.

The therapy employed was 175 to 250cc sodium thiosulphate solution intravenously and six nitro-hyposol or G.M.T. tablets in capsules at three-hour intervals until two doses had been administered. These tablets were given to prevent further absorption of prussic acid and are a necessary part of the treatment. There were 225 cows and calves in this herd. Twenty cows (only three of which were treated) and two calves died.

J. D. WILLIAMS

Colorado City, Texas



Scrotal Necrosis in Sheep Following Use of an Emasculatome

September 15, 1943, I was asked to castrate eight large buck lambs, weighing about 90 pounds each. I used a Burdizzo style emasculatome. Because the buck lambs were so large, the usual lamb size emasculatome was discarded in favor of the bull size emasculatome. My previous use of these instruments on sheep and bulls had given excellent results.

The sheep were carefully restrained and the emasculatome used in the routine manner. Particular attention was paid to avoid the medial septum of the scrotum. No difficulty was experienced in the castration.

A week later the owner asked me to examine the entire herd of sheep as he thought they had a maggot infestation (fleece worms) in the wool. At that time he stated that the emasculated bucks had caught their scrotums on some sharp scrap iron in the woods where they were being pastured.

This examination of the flock, which was made 10 days after the young bucks had been castrated, revealed considerable maggot infestation in the wool; also complete necrosis of both scrotum and testicles in five of the bucks and atrophy of the testicles in the other three bucks. No evidence of previous lacerations was found to substantiate the theory that the bucks had torn their scrotums on scrap iron.

Ten bucks, emasculated 10 months previously, showed no evidence of sexual virility and no testicular tissue could be located on palpation. The cods were apparently normal.

The maggot infested wool was clipped and a 5% aqueous solution of phenol was applied to the infested areas. The necrotic genitalia were removed with a scalpel with no evidence of pain and but slight hemorrhage.

Three weeks later this flock was again examined during routine teniacide treatment and all sheep were found to be healthy, vigorous and gaining weight rapidly. There had been no deaths among the emasculated sheep.

I am at a loss to explain satisfactorily the scrotal and testicular necrosis. It has been suggested by other veterinarians familiar with the instrument that the emasculatome may have had a too fine adjustment with resultant crushing of the cutaneous vessels as well as the spermatic cord.

It is only fair to the instrument to state that I have used it on several thousand animals with 98.7% efficiency. I have yet to lose an animal from its use.

A number of members of my local association have evinced interest in this particular case. We shall appreciate any comments, criticisms or similar case reports.

R. B. CASTLE

Ithaca, Mich.

Book Reviews

Care of the Dog. *By Will Judy,* Editor of *Dog World.* Second Edition, 96 pages, 65 illustrations. The Judy Publishing Co., Chicago. Price $1.50.

The first edition of this work was reviewed in some detail (VETERINARY MEDICINE, November, 1940, page 668). The only material change in the second edition is in the price—raised from $1.00 to $1.50. It might have been expected some of the conflicting statements in the earlier edition would have been harmonized in this one, but such is not the case, e.g., p. 88, "If your dog is a bitch (do not use the word female), is healthy . . ." and on p. 89, "If you have in mind to alter your dog (castrate the male or spay the female) it can . . ." On page 16 "female" is used seven times, "bitch" once.

Judy's "Care of the Dog" can be recommended to the new dog owner with confidence.

* * * *

The Diseases of the Genital Organs of Domestic Animals by *W. L. Williams,* Professor Emeritus, Cornell University. Third edition, 641 pages, 196 illustrations. Published by the author, Ithaca, N. Y., 1943. Price $9.00.

The second edition of this scholarly work appeared only four years ago. (Reviewed in January, 1940, issue of VETERINARY MEDICINE, p. 64.) Since no great change has been made in the text of the present edition and only 24 pages have been added one infers it was exhaustion of the stock of the second edition that brought about this revision. This is indicative of a healthy demand for a work on breeding diseases that offers no short cuts to success in their control nor easy solution of the problems of the breeder.

Since that day, now nearly 66 years ago, when Professor Williams was graduated from the old Montreal Veterinary College he has been a student of animal reproduction and a keen observer of the diseases that interfere with it. Probably none of our livestock sanitary officials entirely agrees with him but all must be impressed with his profound knowledge of the subject and his confidence in his conclusions. His attitude toward abortion in animals is illustrative: He has watched unmoved the blue days of methylene blue, the rush to carbolic acid, the reliance upon Waukesha water, the faith in Bowman's brown sugar, the surge to bacterins, the blood cult and vaccination. All to him are destined to failure and all are unnecessary provided sensible breeding hygiene is observed (and he supports his contention with observations upon thousands of animals). Monsters, twins, triplets and dystocia are not accidents but logical results of definite and often preventable causes. Sterility and shy breeding may be determined by the feed and care of the calf during the first few months of its life as certainly as by mishandling the cow years later. It's a thought-provoking work that takes nothing for granted and dissects an accepted dogma with the same enthusiasm that it takes apart the newest postulate.

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Practical Veterinary Pharmacology, Materia Medica and Therapeutics by *Howard Jay Milks,* D.V.M., Professor of Therapeutics and Director of the Small Animal Clinic, New York State Veterinary College at Cornell University. With a chapter on Biological Therapeutics by Adolph Eichhorn, D.V.S., Director, Animal Disease Station, U. S. Bureau of Animal Industry. Fifth edition, 673 pages. Alexander Eger, 1943. Price $7.00.

That this standard work on veterinary pharmacology should have dominated its field for nearly three decades is due of course to its revisions to keep it abreast of progress in veterinary therapeutic agents.

Previous editions having been reviewed in some detail it is necessary to mention only changes incorporated in the current edition: A chapter has been added on the sulfonamide compounds and the chapters on vitamins and sex hormones have been rewritten to incorporate the latest information on those subjects. New drugs described are N-butyl chloride, phenylmercuric nitrate preparations, atabrine, aluminium chloride, neo-calamine, plasmochin, nemural, bentonite, aluminium silicate and the more commonly used sulfa drugs.

A fault in this and previous revisions of this work is the failure to delete or minimize the discussion of remedies that have been replaced by new discoveries, have fallen into disuse or are of minor value for other reasons. While adding new material

reflecting the progress in materia medica has been added from edition to edition the old discussions, based upon conceptions that have long since been altered, have been retained. Thus a discussion of iron and iron compounds occupies 10 pages of the text, and the discussion of the whole group of sulfa drugs is limited to the same number of pages. The discussion of belladonna occupies six pages, of diethylstilbestrol, one page. Four pages are devoted to phenol including a discussion of its use in the treatment of tetanus, and the statement "phenol is a very useful disinfectant for buildings," while liver and liver preparations are disposed of in a quarter page and allantoin, maggots and urea in less than a page. Many other instances of lack of balance are evident.

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Disease and Parasites of Poultry. By *Edgar Hugh Barger,* D.V.M., formerly Pathologist, Illinois Department of Agriculture, and *Leslie Ellsworth Card,* Ph.D., Professor of Poultry Husbandry, University of Illinois. Third revised Edition, 400 pages, 84 illustrations. Lea and Febiger, Philadelphia, 1943. Price $3.75.

The preceding editions of this work were reviewed in these pages[1, 2] in some detail. The authors' views concerning the prevention, control and treatment of disease in poultry are protrayed in the following extract from the preface:

"It is our belief that the health and efficiency of any flock depends not only on the eradication and control of transmissible diseases, but even more on soundness of body and inherited vigor, on adequate nutrition in the sense of complete rations which are reasonably well balanced, and on suitable environment including physical and sanitary protection. It is our further belief that the successful control of most diseases and parasites of poultry depends more on strict adherence to the principles of hygiene and sanitation than on the use of medicinal agents and so-called cures."

The foreword by Dr. L. Van Es further elucidates this position:

"Among the advances already gained, perhaps the most conspicuous one is associated with those facts which inevitably lead to the conclusion that the solution of this tantalizing problem [health of the flock] rests with the practice of hygiene and sanitary management as a principle solidly established."

[1] *Veterinary Medicine,* 1936, 31:1, p. 39.
[2] *Veterinary Medicine,* 1938, 33:11, p. 543.

Briefly the authors' envision little opportunity for veterinary medicine, at least on the professional plane, to render a service to the poultry industry. Therapy either curative or preventive is regarded as on the whole ineffective or uneconomic, usually both. Good management including good hygiene and good sanitation is regarded as the solution of the problems of loss and is the function of the poultry husbandman "because all ways and means of disease prevention must be kept within the bounds of economic possibility." There can be no objection to the authors stating their opinions but in view of the fact that neither can have any knowledge of the field of veterinary practice a little less dogmatism and a little more modesty would have become them better.

You may obtain any book reviewed in this department by remitting the published price to the Book Department of VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago, Ill.

The work comprises 14 chapters dealing with: The mortality problem, nature of disease, anatomy of the fowl, poultry surgery, diagnostic methods, bacterial diseases, virus diseases, protozoan diseases, nutritional disorders, miscellaneous conditions, internal parasites, external parasites and controlling flock mortality. The discussions are intended for the poultryman but except for the chapters on anatomy and surgery will not be found too elementary to interest and instruct veterinarians. The conciseness of the discussions is commendable and more than 600 references to more comprehensive literature [overwhelmingly veterinary] afford the reader exhaustive discussions when such are desired.

The authors state "There are but few drugs which have any practical application in everyday poultry management." Notwithstanding a generation of such teaching the poultry industry spends 20 million dollars annually for what it considers remedies. This may indicate that the industry is somewhat out of step with the authors.